



Segolily

Newsletter of the Utah Native Plant Society

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Small-leaf globemallow

(*Sphaeralcea parvifolia*) is one of the most common of Utah's 15 species of *Sphaeralcea*. It can be recognized by its palmately veined maple-like leaves and orange blossoms that occur in groups of 2 or more at each node of an elongated inflorescence. Like other globemallow species, *S. parvifolia* is cold and drought hardy and thrives in full sun. Globemallow fruits are hard and may persist ungerminated for several years. Germination can be facilitated by nicking the fruit with a razor blade or sandpaper (scarification). For more on globemallows and the mallow family in general (and the prominent role of one species in the settlement of southern Utah) see the articles on pages 6 and 8 of this issue.

Illustration by W. Fertig



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Utah Native Plant Society

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Articles, photos, and illustrations from members are welcome and encouraged. The deadline for the March 2007 Segó Lily is 15 February 2007.

Website: For late-breaking news, the UNPS store, the Segó Lily archives, Chapter events, links to other websites (including sources of native plants and the digital Utah Rare Plant Field Guide), and more, go to unps.org. **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

President's Corner:

What does UNPS stand for?

Easy answer: "Utah Native Plant Society". But what does the *Utah Native Plant Society* stand for? Our charter says we are "a charitable organization dedicated to the understanding, preservation, enjoyment, and responsible use of Utah native plants."

There are many ways we can do this, from the very simple to the very ambitious. I like to think of them all as coming from the same perspective: that the plants are not mere adjuncts to our pleasure, but are worthy of our respect *in their own right*. A rare cactus should not be dug out of its remote nook in the desert just so that more humans will be able to appreciate its beauty ("Full many a flower is born to blush unseen . . ."). It's OK in its own little corner, even if *nobody* gets to visit.

How have we gone about our mission in the past year?

"Understanding" Last Spring we awarded a research grant to Ashley Egan, a BYU graduate student, to conduct research on a rare plant (Paria Breadroot, *Pediomelum pariense*). Ashley is studying how much genetic interchange occurs between the small, isolated populations of this species and how this might affect its long term survival. Information like this is crucial for deciding how best to protect rare species. Other individuals continue

their work of describing species and understanding how they contribute to the big picture.

"Preservation" Some of our work is direct, some indirect. Our Conservation committee, chaired by Tony Frates and Bill King, has been very busy again, trying to track actions that affect our rare and endangered plants. This can be a nightmare in an era when governmental edicts may pit political expediency against science-based judgment, sometimes placing impossible burdens on agency personnel. We have joined formal petitions on actions to

- preserve particular species and habitats
- oppose the Washington County land bill
- support the continued designation of roadless areas within National Forests.

Conversely, we have declined to join other petitions where we have felt the evidence is not so convincing.

A surprising number of our members are professional botanists, working with governmental agencies, universities, conservation organizations, or environmental consulting companies. What do they do in their spare time? Many of them donate hours to projects concerned with protecting native plants. For example, this Fall we were contacted by The Nature Conservancy of Utah (one of our most treasured partners in conservation work) to see if UNPS could help with plant surveys of an area in Cache Valley that was being considered for a conservation easement. Several members of the Cache chapter gave their professional services to this project.

In addition to these professionals many other members have participated in plant surveys, weed pulls, letter writing, and other ways of counterbalancing threats to our native species. A big "Thank You!" to all our members who participated in these efforts.

"Enjoyment" I hope that every member has been able to get out and enjoy some of the splendid displays of our wildflowers and other plants. Chapters have organized many wildflower walks and field trips, at elevations from the southern deserts to almost 12,000 feet in the Uinta Mountains. This is a tremendously important activity, especially when shared with people who need some guidance about what they are seeing – not just names of plants, but how they fit together. Just walking with someone can help them see things in a different light. Thank you, all who have participated in this way, sometimes showing our plants to visitors from out of state who will have gained a deeper sense of what Utah has to show the world.

"Responsible use" The obvious context is that of using native plants in landscaping. From the plant's perspective, we need to be thoughtful, and ensure that this does not deplete natural populations. UNPS has been active in promoting local plant propagation workshops in which people learn to grow native plants from seed. It is equally important to *avoid* plants such as Myrtle spurge that can escape and threaten native habitats like the foothills of the northern counties. We are working with nurseries to recommend the best plants for use in water-wise gardening.

Perhaps the founders of UNPS felt that these four headings covered the most important ways in which we should work. I like to turn it around and think that they are all closely linked to another theme, which is that of **EDUCATION**. We are very limited in our resources of time, energy and money. We'll do more by sowing seeds than by transplanting shrubs, and the most fertile ground is that of young minds. In all the activities listed above we are in parallel trying to educate others, mostly adults. Just today the board of directors voted to award an educational grant to Michael Yardley, an elementary school teacher in the little town of Enterprise, west of Cedar City. Mike will have the children plan and script two videos on native plants as part of their 4th grade curriculum. What a way to get them involved in the natural world! The actual shooting will be done by professionals, making for a product that will be available for other schools through the Utah educational network.

The Coming Year. My biggest hope is that we shall get more people involved in UNPS activities. First, but by no means the easiest, is to get existing members doing a wider range of things. And for that the impetus has to come from within the chapters – talks, walks, weed pulls, plant sales, beautification with native plants. You are on the spot, and the only ones who know the local scene. Chapter presidents

sometimes have a very hard time getting people to participate: they are listed on page 2, so contact them and offer to help.

Second is to recruit more new members. Use the Gift cards available through the website (or contact me directly). They are only \$10 for a year's membership including the Segó Lily. A broader membership base leads to more active programs, more funds for giving grants, and a larger pool of volunteers.

Third, closely connected with the last, we want to establish chapters in places where there is a big enough population base. Two chapters are in the planning stage: Fremont, organized by Maria Ulloa, will serve the Richfield area, and a Cedar City chapter will be organized by Winnie Washburn. We would love to see another in the populous area along the east shore of the Great Salt Lake – let us know if you are interested.

Have a wonderful year, enjoy our plants, and share the fun with others. – *Bill Gray, UNPS President*

State Board Report

At its meeting on Nov. 30th the board appointed Richard Jonas to its vacant position and elected the following officers for the 2007 year: President, Bill Gray; Vice president, Bill King; Treasurer, Celeste Kennard; Recording Secretary, Richard Jonas.

Chairpersons were appointed for 3 of our standing committees: Conservation, Bill King, with Tony Frates; Horticulture, Maggie Wolf; Invasive Weeds, Susan Garvin. We did not yet appoint chairs for Education and Communication.

We also agreed that UNPS should hold a statewide Spring Conference each year, hosted by one of the southern Utah chapters (see reminder below).

An invitation to serve: if you have interest in helping with any of the above committees, please contact Bill Gray (801-532-3486; cyberflora@xmission.com). – *Bill Gray*

First UNPS Spring Conference

When: May 17-19 2007

Where: Kanab and vicinity

The Manzanita Chapter will host the first UNPS Spring Conference. Our aim is to get members together to enjoy Spring in the desert. We'll have some talks, some walks, some thinking about our future, and lots of socializing. We hope this will be the first of many get-togethers in which we focus on what UNPS has done and where it is going.

More details in the March Segó Lily

UNPS Annual Members Meeting

Oct 21, 2006, Logan, UT

Buffet tables loaded with colorful and delicious dishes of sweet potatoes, tomatoes, beans, corn, squash, pumpkins, peppers and other foods native to the Americas greeted UNPS members and guests as they arrived at the annual Meeting of the Members, held this year in Logan. Among the specialty dishes were spicy chili with beans and bison, green tomato pie, quinoa salad and squash soup. Plenty of roast turkey provided a final touch to this fine spread.

Hosted by the UNPS Cache Chapter, the meeting was held in one of Logan's older buildings. Originally built in 1887 as an LDS meetinghouse, the expanded and remodeled facility has been in private hands for the past 30 years. Now it houses a private school and is the venue for Audubon meetings and other events.

After the buffet thinned out a bit, Susan Garvin, Chairperson of the 2005-6 UNPS Board of Directors, began the meeting. Everyone was introduced and given the opportunity to talk about their food dish. Some people came all the way from Richfield, and others had taken advantage of their trip to northern Utah to do a little hiking in Logan Canyon.

The main item of business was the election of the Board of Directors for 2006-7, in accord with UNPS Bylaws. Members unanimously approved the 19 people proposed for the Board (see complete list on page 2). 2005-6 Board Members Tony Frates and Gene Schupp retired from the Board, and Ty Harrison, Maggie Wolf and Loreen Woolstenhulme were newly elected.

Bill Gray, 2005-6 Co-President with Mindy Wheeler, will stay in the President's chair for the coming year. He plans to focus on membership and chapters to strengthen the Society's base. Bill also announced Walt Fertig's new role as Se-go Lily newsletter editor. Susan Garvin, retiring Chair of the Board, was presented with a gift certificate to Amazon.com in appreciation of her years of service in top positions at UNPS.

After the business portion of the meeting, everyone moved to a nearby room for Dr. Leila Shultz's presentation "Three Hot Spots for Rare Plants in Utah", but first we were treated with a glimpse into some little-known aspects of her past when Robert Fitts introduced his "major professor" from his student years at Utah State University.

There are 250 to 300 Utah plant species deserving protection, according to Leila. Utah has a convergence of eco-regions, with subsequent plant hybridization and isolation that resulted in many plants endemic to particular geological formations. The three "hot spots" she emphasized were the Uinta Basin oil shale country, the area around Logan, and Washington County's White Dome.



Above: Maguire's primrose (*Primula maguirei*) by Kaye Thorne from the *Utah Rare Plant Field Guide*.

Leila's photographs of the Uinta Basin oil shale of Parachute Creek featured a landscape of white weathered rocks with black oily material inside. Rare plants of this area include *Penstemon grahamii*, *Sclerocactus wetlandicus*, *Glaucocarpum (Schoenocrambe) suffrutescens*, *Cryptantha grahamii*, *Cryptantha barnebyi*, *Cryptantha rollinsii*, *Astragalus lutosus*, and *Cymopterus duchesnensis*. The current energy development boom is threatening this area, as evidenced by her dramatic photo of a land scarred by a network of roads and gas wells, taken a few days earlier through the window of an airplane.

The Logan area has a number of rare endemic plants, presumably due to a convergence of geographic regions. Examples include *Primula maguirei*, *Penstemon compactus*, *Viola frank-smithii*, and *Orthocarpus tolmiei* var. *holmgreniorum*, a pink-purple version of the more familiar yellow owlclover. Leila emphasized the need to pay more attention to these rare plants, otherwise, "who will know if they disappear?"

The proposed White Dome Nature Preserve is Leila's third "hot spot" where the Dwarf bear-claw poppy (*Arctomecon humilis*) lives in gypsum-rich soils. Other rare plants in the area are *Pediocactus sileri* and *Astragalus holmgreniorum* along with rare reptiles and insect pollinators.

Leila also mentioned one of her projects, the Digital Atlas of the Vascular Plants of Utah, at earth.gis.usu.edu/plants/. Here you will find an interactive Utah map showing locations for nearly 3300 plant species.

Finally, Joan Degiorgio of The Nature Conservancy told the audience about the Utah Heritage Program and the Uinta Basin Rare Plant Forum, a proactive effort to better protect plants threatened by oil and gas development.

- Dave Wallace

Chapter News and Events

Cache: The Utah Native Plant Society-Cache Chapter and Master Gardeners of Cache Valley will be holding three sessions of their native plant propagation workshop: Saturday March 3rd (9 to 11 AM and 1 to 3 PM) and Thursday March 8th (6 to 8 PM). Cost is \$15 for UNPS or Master Gardener members and \$20 for everyone else. Pre-registration is required - for information call (435) 752-6263. The workshops will be held at the USU Teaching Greenhouse at 1389 North 800 East, Logan, UT (Corner of 800 East and 1400 North). New plants this year include *Linum kingii*, *Sporobolus cryptandrus*, *Arcostaphylos nevadensis*, and others. – *Steve Ripple*

Escalante (Garfield County): On November 9 Walt Fertig came up from Kanab to give a presentation on the native plants of Cedar Breaks National Monument. Chapter founder Winnie Washburn, who recently relocated to Cedar City, was able to join us for the meeting and celebrate the 50th anniversary of her 38th birthday. We shared Winnie's special day with birthday cake and other snacks.

On November 30, we did a clean up of the Main Street plant garden project with volunteers from the local school.

Starting in January, we will hold meetings on the 2nd Tuesday of the month instead of on Thursday. A program for January is yet to be arranged. Carolyn Shelton of the Kanab Chapter will provide us with an engaging program on plant reproduction in February. – *Allysia Angus*

Manzanita (Kane County): Mark Miller of the USGS Biological Resources Division gave a presentation on "My friend the Shivwits milkvetch" at our December meeting. Mark and his crack research team have been investigating the soil and habitat characteristics of the Endangered *Astragalus ampullarioides* in Zion National Park and elsewhere in Washington County, as well as studying effects of herbivory and weed competition. Larry Baer kicked off our Christmas party by presenting samples of his State Fair-winning jams and preserves. The results of our November board elections were announced, with Walter Fertig elected umbrella leader, Jana de Peyer vice president, Anne Mejia treasurer, Steve Dahl secretary, and Peggy Stone, Mark Miller, and Carolyn Shelton board members "at large". – *Walter Fertig*

Salt Lake: The Salt Lake Chapter will be co-hosting a Potluck Social with the Wasatch Rock Garden Society on January 17th at 7:00pm. The event will be held at the Tracey Mill in Liberty Park and will feature a slide show and dinner.

Chapter meetings will be moved to our new location in the Wasatch Board Room at REI on 3285 East 3300 South beginning February 7th. This location is easily accessible from I-215 and I-80. Tony

Frates will be the featured speaker and will discuss the status of several threatened and endangered plants in Washington County and the Uinta Basin.

– *Kipp Lee*

Southern (Washington County): The Southern Chapter will hold their annual Propagation Workshop on Feb. 3. We will have many new locally collected species to work with, including a number of flowers, several nice grasses, and a shrub or two. It will be taught by Rick Heflebower. Co-sponsored with the Zion Canyon Field Institute; cost is \$20. Sign up or get further info at www.zionpark.org or call (435) 772-3264 or 1-800-635-3959. ZCFI will also have several other related workshops: Native Plants and Xeriscaping taught by Lisa Ogden and Organic Gardening taught by Aviva O'Neil.

– *Margaret Malm*

Utah Valley (Utah Co): At our November Quarterly meeting we found out that the Central Utah Water Conservancy has accepted Utah Valley Chapter's proposal for a Native garden on their site (yahoo!). The garden will be front and center immediately off the main parking for the gardens. Bitsy Schultz designed the garden and we have been working with their (CUWCD'S) new Horticulturalist Megan Guenter and Nancy Hardman their Conservation Programs Coordinator on plans for maintenance and installation.

Our meeting that night seemed like an event that was in the making for many years. I seem to recall sitting at the Utah Native Plant Forum in 1997 at UVSC, that is located across the street from the Central Utah Water Conservancy District, and dreaming that the expanse of Kentucky Blue Grass at the CUWCD would one day become something more suited to the name that the agency's title proclaims... "Conservancy". We hope to be installing the garden Fall of 2007 and we would love to hear from any of you that would like to help.

February 16th will be our next Quarterly Meeting at the Federal Building in Provo 88 W 100 N. We will have a pot luck meal at 6:00 with a lecture starting at 7:00. The topic will be gardening related.

Also at the November 2006 Quarterly meeting we re-elected Celeste Kennard as President, Tamara Bahr as Secretary and Randall Nish as Treasurer. In April we are planning a plant sale and in May a Yard tour. – *Celeste Kennard*

UNPS Lifetime Member Update

Teresa Mareck of Salt Lake City, UT became our 26th lifetime member in July 2006 and Erin Robertson of Louisville, CO became our 27th in October 2006. Thanks to both for your support!

Utah Plant Families: The Mallow Family (Malvaceae)

By Walter Fertig

The Malvaceae is a relatively large plant family with more than 1800 species in 110 genera. Mallow diversity is greatest in the tropical and subtropical parts of the world, especially Central and South America. In North America, the diversity of native mallows is highest in Mexico and the southern tier of US states, becoming progressively lower with increasing latitude. Two dozen native mallow species (in seven genera) are known or reported from Utah, with over half belonging to just one genus – the globemallows (*Sphaeralcea*). Another nine species in four genera are recent arrivals as garden escapees or weeds.

Compared to many families, members of the Malvaceae are easy to recognize. Most mallows have leaves that are palmately lobed or veined (like a maple leaf) and arranged alternately on the stem. Foliage and stems usually have star-shaped (“stellate” in botany-speak) hairs, a feature found infrequently in other families (though seen sporadically in the mustard, oak, goosefoot, euphorb, honeysuckle, and nightshade families). But the most diagnostic characteristic of the mallows is the structure of the flower. The stamens are fused by their basal stalks (or filaments) into an elongated tube with the pollen-bearing anther heads poking out along the side. The staminal tube encloses 3-40 styles which lead to an equal number of seed-producing carpels. At maturity, mallow fruits split along the boundaries of each carpel to form numerous wedge-shaped segments (technically each segment is a mericarp and the entire fruit a schizocarp or “split-fruit”). The size, shape, and ornamentation of the mericarps can be useful in differentiating among mallow species, particularly the globemallows (see photo on page 9).

Easily the most economically significant members of the mallow family are the nearly 40 species of cotton (genus *Gossypium*). Archaeological evidence shows that humans have been growing cotton and using its fiber-coated seeds for spinning cloth for at least 4000 years. Cultivation of cotton originated independently in India, Mexico, and Peru. Today cotton is the most widely grown non-food crop in the world. Besides the long fibers (“lint”) used for cotton thread, shorter hairs (“linters”) on the seeds are dried and bleached for use in smokeless gunpowder, cellophane, plastics, chewing gum, and dynamite. Cottonseed oil is used in the manufacture of margarine, cooking oil, and vegetable shortening (Crisco was first developed from crystallized cotton seed oil). Seed meal is used for animal feed, fish bait, and fertilizer. Unfortunately, the seed contains gossypol, a poisonous chemical that has to be removed. Breeders are attempting to develop gossypol-less strains that could be used for human consumption.



Above: Upland cotton (Gossypium hirsutum) is still grown as an ornamental or occurs sporadically as a garden escape on ditchbanks in and around St. George. In the 19th Century, mormon pioneers of the ‘cotton mission’ raised this species in Utah’s Dixie. Illustration by W. Fertig.

Commercial-scale production of cotton was initially hindered by the difficulty of separating the long fibers from the seeds. As all of us remember from 4th grade history class, this conundrum was resolved by Eli Whitney and the invention of the cotton gin, a mechanical device for removing lint from seed. This invention, and subsequent mechanical techniques for spinning cloth from cotton fibers, ushered in the industrial revolution in western Europe and the United States. Mechanization was much slower in coming to the planting and harvesting of cotton fruits (‘bolls’), necessitating a large human labor pool for production. This demand led to the expansion of the “peculiar institution” of legalized slavery in the United States in the late 1700s and early 1800s, one of the most shameful episodes of recent human history. Cotton’s grip on everyday life in the American South was finally weakened by the US Civil War, emancipation, mechanized harvesting, postwar economic diversification, and the boll weevil, a little beetle from Mexico that slowly but relentlessly overtook America’s cotton belt from 1892-1921.

Cotton also played an important role in the early history and settlement of southern Utah. Concerned about potential hostilities with the federal government and being cut off from cotton supplies in the south in the event of looming Civil War, Brigham Young sought to have the Utah territory be self-sufficient in cloth. In 1857 Young sent several dozen Mormon families from northern Utah to the Virgin River Valley 300 miles to the south (and in a more favorable growing climate) to establish communities dedicated to raising cotton – the so-called cotton mission. Though the area around St. George and Santa Clara was conducive to growing cotton (and

most anything else with proper irrigation), the cotton mission struggled for many years due to flooding, difficulties with native tribes, and the expense of shipping cotton lint to markets. Eventually the settlers converted to other crops (including grapes for wine) to feed the burgeoning mining camp at Silver Reef and cotton was abandoned as a cash crop. Utah's cotton country is known locally as "Dixie" for its cotton heritage (and southerly location). Upland cotton (*Gossypium hirsutum*) is still grown occasionally near St. George and occurs infrequently along roadsides and ditchbanks.

Several other non-native members of the mallow family have economic uses. Hollyhocks (*Alcea rosea*) and Rose-of-Sharon (*Hibiscus syriacus*) are among the more popular garden plants in the Malvaceae. The original source of marshmallows came from gelling agents derived from the roots of the European marsh mallow (*Althaea officinalis*). Today commercial marshmallows are mass-produced using egg whites, gelatin, gum arabic, and sugar or corn syrup (though vegan marshmallows can still be made using extracts from the marshmallow plant in place of eggs). Okra or gumbo (*Abelmoschus esculentus*) has a supposedly edible fruit pod. Velvetleaf (*Abutilon theophrasti*) was formerly grown as a fiber crop to make twine. In the eastern US it is a serious agricultural pest in corn and soybean fields.

Most of the cultivated species in the Malvaceae have not become problem weeds in the arid climates of Utah and the west. The common mallows of the genus *Malva* can be a minor nuisance of lawns and flower beds in suburban settings, but rarely become dominant. The fruits of *Malva* split into wedge-shaped segments resembling slices of cheese, giving the plant its common name of cheeseweed (though it actually has a nutty taste). Flower-of-an-hour (*Hibiscus trionum*) occasionally becomes established in gardens, fields, and other disturbed sites, including the "native" landscaping of the new visitor center at Arches National Park.

Most of our native mallow species have large, showy flowers and have good potential for use in native landscaping. Mountain hollyhock (*Iliamna rivularis*) resembles cultivated hollyhock in stature and leaf shape, but does require fairly moist soils since its natural habitat is along mountain streams. The three checkermallow species (*Sidalcea*) likewise are found in riparian habitats in the wild and fare best in wetter soils. The checkermallows superficially resemble the more widespread globemallows, but have white, pink, or purplish flowers and more deeply divided stem leaves. Desert five-spot (*Eremalche rotundifolia*) is one of the signature early spring wildflowers of the Mohave Desert and is characterized by a deeply bowl-shaped pink corolla with contrasting red or purple spots at the

base of each petal. It has recently been reported for Washington County, Utah in Volume 2b of the *Intermountain Flora*.

The largest and most conspicuous genus of Malvaceae by far in Utah are the orange-flowered globemallows (*Sphaeralcea*— see companion story on page 8). Four of our 15 reported species are widespread and often conspicuous along highways in spring and summer. Several others, however, are extremely rare and have limited distributions, often tied to unusual substrates. Among these is Tufted or Jones' globemallow (*Sphaeralcea caespitosa* var. *caespitosa*), which is restricted to shrub and grassland communities on dolomitic gravels in a small area of Millard and Beaver counties. This species combines low stature with some of the largest blossoms in the *Sphaeralcea* genus, and would make an outstanding horticultural plant in arid climates because of its tolerance of full sun and low moisture. As with all native wildflowers though, mature plants are best left intact in the wild and garden plants should only be grown from seed.

Below: Tufted globemallow (Sphaeralcea caespitosa var. caespitosa) by Kaye Thorne. The type locality of this species is "Wa Wa, Wah Wah Mountains, Beaver Co, Utah". The collector, Marcus E. Jones, must have had a great sense of humor.





Sphaeralcea grossulariifolia by Tyler Thompson.

Some Common Globemallows of Utah and How to Recognize Them

By Therese Meyer
Great Basin Research Center,
Utah Division of Wildlife Resources

There are 40 species of *Sphaeralcea* worldwide (all from North and South America). Fifteen species are found in the Intermountain region. Utah is approximately divided North to South as to species.

Of the 15 species in Utah, four are widespread and most commonly confused with one another (*coccinea*, *grossulariifolia*, *munroana*, *parvifolia*), four are restricted to a single county in Utah (*angustifolia*, *fumariensis*, *gierischii*, *digitata*), and seven are restricted to a few counties (*ambigua*, *caespitosa*, *rusbyi*, *moorei*, *leptophylla*, *janeae*, *psoraloides*). Of all of these, six are endemics or near endemics (rare; restricted to a specific soil or formation) in Utah (*caespitosa*, *fumariensis*, *moorei*, *gierischii*, *janeae*, *psoraloides*).

There are weak character differences among species which is further complicated by polyploidy and hybridization. Some general characteristics: they are annual or perennial; the plant has stellate pubescence; leaves are entire, deeply divided or compound; the inflorescence is a solitary flower or thyrsoid in the leaf axils or in terminal panicles; flowers are grenadine, lavender, yellow or white; fruit is a schizocarp comprised of several mericarps.

For identification of the four most common species in Utah, use the following characters:

Leaves: shallowly lobed, deeply lobed or not; length-to-width ratio.

Calyx: length, lobe length, gross shape.

Inflorescence: thyrsoid, paniculate or racemose; number of flowers per node*.

Flower stem: panicle length.

Pubescence: density; coarse or delicate.

Pubescence rays: slender or not, radiating in single or multiple planes.

Simplified Key

- 1 Leaves entire or shallowly lobed
 - 2 Leaves densely pubescent and noticeably stellate (leaves appearing gray-green) *S. parvifolia*
 - 2 Leaves moderately or sparsely pubescent (leaves appearing green) *S. munroana*
- 1 Leaves deeply lobed
 - 3 Inflorescence thyrsoid; mericarp higher than wide *S. grossulariifolia*
 - 3 Inflorescence a raceme; mericarp wider than high *S. coccinea*

More detailed descriptions of the four species keyed above:

Sphaeralcea parvifolia (Small-leaf globemallow)



Thick caudex, short side branches, all cauline leaves, leaves deltate ovate, stellate pubescence, palmate venation. Inflorescence is narrowly thyrsoid, pedicel 2 to 10 mm, calyx 5 to 8 mm. Densely pubescent.

Approximately 10 mericarps/schizocarp; 2.8 to 4 mm high, 2 to 2.3 mm wide. Utah: southern and eastern 2/3: Grand, San Juan, and also Cache County in the north. 750 to 2450 m elevation.

Sphaeralcea munroana (White-stem globemallow)

Thick crown, multi-stemmed or woody, short-branched caudex, less side branching or unbranched. Herbage more green, lighter pubescence. Papery-thin leaves; longer than wide. Veins not prominent as in *parvifolia*. Three flowers per node, narrowly thyrsoid-glomerate. Pedicels stout, mostly shorter than the calyx. Schizocarp ~ 10--12 (17) mericarps. This species has a more northerly distribution in Utah but also in Sevier Co., at elevations of 640--2400 m. There is one variety in northern Utah along the Wasatch Front, v. *subrhomboidea*, with 3 distinct lobes cleft about halfway into blade that may be derived from hybridization with *grossulariifolia*.

*Note: the thyrsoid or paniculate inflorescence will have 2 or more flowers per node, whereas the racemose inflorescence will generally have one (rarely 2 or 3) flowers per node: if in doubt, use an average of flowers per node.

Sphaerlacea grossulariifolia (Gooseberry-leaf globemallow)



Perennial thick woody crown, short-branched caudex, multiple stems, erect to ascending, un-branched or short-branched. Herbage greenish, moderate to sparse pubescence, heavy on stems, flattened against stem. Stems

are grayish with pubescence. Petiole is 1.5--5 cm. Blade is thin, and about as wide as long, deltate or broadly ovate, 3--5 lobes; deeply lobed. Inflorescence is relatively thyrsoid-glomerate, the pedicels are stout, shorter than calyx, sometimes longer at lower nodes. Calyx 5--11 mm. Lobes of calyx are ovate to lanceolate and acute. Mericarps 10--12, 2.5--3.5 mm high, 2--3 mm wide. There can be variation in leaf structure due to introgression or interspecific hybridization with other species with which it comes in contact. Distribution is wide throughout the intermountain area at elevations of 800--2300 m.

Sphaerlacea coccinea (Scarlet globemallow)



Smallest of the four species (UNPS considers this the most attractive for horticultural use for its compact habit). It has a highly branched caudex, and the roots often run sideways, can be rhizomatous and they

can form colonies. Branches are decumbent or ascending, usually un-branched or slightly branched. There is very little pubescence, giving the leaves a greener color. The pubescence is always (70% of the time) stellate and away from the plant surface. The blade is 3-foliate, wider than long, and finely dissected. Even lateral lobes are dissected and appear compound or pinnatifid. Inflorescence is a raceme, but in lower parts of the inflorescence there may be solitary flowers, and at upper nodes 1--2 flowers per node. Pedicels are stout and 2--10 mm long. The calyx is triangular at the tip. Schizocarps have height equal to width, and are very pubescent, but there is no pubescence on the seed, although the carpels are sometimes thick and leathery. Mericarps 10--14. Found throughout Utah, from the north to the south at elevations of (1000) 1375--2750 m.



Above: Globe-mallows are often locally dominant, forming large orange carpets that are readily observed from great distances or speeding automobiles. Photo by Therese Meyer.

This article is derived from a presentation given at the Seed Collectors Workshop at Snow College on 22 September 2005. Funding was provided by the USDI BLM Great Basin Restoration Initiative through the USDA FS Rocky Mountain Research Station. The dichotomous keys were prepared with the assistance of Dr. Michael Piep of the Intermountain Herbarium, Utah State University based on *Intermountain Flora: vol. 2, part B: Subclass Dillenidae*.

Below: *Sphaerlacea mericarps* showing the characteristic reticulations on the sides of each fruit segment. Photo by Therese Meyer.

/15-08-2006



Plants in the News



Above: Uinta Basin fishhook cactus (*Sclerocactus glaucus*) by Kaye Thorne.

USFWS to Investigate Status of Rare Uinta Basin Sclerocacti

On December 14, 2006, the US Fish and Wildlife Service issued two 90 day findings responding to petitions to both list and delist two rare *Sclerocactus* cacti from the Uinta Basin of NE Utah and NW Colorado. The first finding rejected a 1997 petition by the National Wilderness Institute* to delist the Uinta Basin hookless cactus (*Sclerocactus glaucus*). The petition claimed that the Service listed this species as Threatened under the Endangered Species Act in 1979 using erroneous data. In rejecting the motion, the US Fish and Wildlife Service found that the petitioners offered no new information to corroborate their claim.

The second finding found sufficient information exists to consider listing the Pariette cactus (*S. brevispinus*) as Threatened or Endangered. This finding came in response to a petition filed in 2005 by the Denver-based Center for Native Ecosystems and the Utah Native Plant Society. Although the second finding does not ensure that listing will occur, the US Fish and Wildlife Service has agreed to review the status of *S. brevispinus* and the related Ouray cactus (*S. wetlandicus*) within the context of a 5-year review of the protective status of *S. glaucus*, to be completed in 2007. If the Pariette cactus meets the Service's five listing criteria (present or threatened destruction, modification or curtailment of habitat or range, overutilization, disease or predation, inadequacy of existing regulatory mechanisms, or other man-made or

* Despite the green sounding name, the National Wilderness Institute is a Washington based "wise use" group that frequently sues USFWS over the Endangered Species Act.



Above: Pariette cactus (*Sclerocactus brevispinus*). Photo by Tony Frates.

natural factors affecting continued existence) it will be added to the nation's roster of endangered species and afforded greater protection on public lands and from private collection.

Sclerocactus brevispinus is restricted to the Pariette Draw area of the central Uinta Basin along the Duchesne/Uintah county line in NE Utah. It differs from *S. glaucus* in having a more spherical shape and in either having shorter central spines or lacking such spines altogether. The Pariette cactus was first named as a new taxon by German cactus enthusiast Fritz Hochstatter in 1993, under the name *S. wetlandicus* var. *ilseae*. Ken Heil and Mark Porter described the same taxon as a full species in 1994, giving it the name *S. brevispinus*. Genetic, morphologic, and common garden studies by Porter and colleagues since then have confirmed that *brevispinus* is distinct from *S. glaucus* and Hochstatter's other segregate taxon, *S. wetlandicus* (described from the same vicinity in Pariette Draw). Stan Welsh recognizes the Pariette cactus as a variety of *S. whipplei* (var. *ilseae*) in the third edition of *A Utah Flora*, but does not acknowledge *wetlandicus*. Traditionally, the US Fish and Wildlife Service has recognized all three segregate taxa as part of *S. glaucus* and all are afforded protection under the Endangered Species Act, though this interpretation could change following the proposed 5-year review.

The entire population of Pariette cactus is estimated at 3795 individuals within a global range of less than 15,000 acres. Over 90% of the plant's range is within active oil and gas fields, mostly on lands managed by the BLM. Impacts from mineral development in the Uinta Basin include direct mortality of plants, soil compaction, increased access by offroad vehicles and illegal collectors, and greater habitat fragmentation. The BLM considers *S. brevispinus* a Sensitive species and has designated the Pariette Wetlands Area of Critical Environmental Concern (ACEC) to protect 2384 acres of cactus habitat, though the ACEC does not impose any



Above: Ouray cactus (*Sclerocactus wetlandicus*) is considered a separate taxon by some, or a form of *S. glaucus* not warranting taxonomic recognition by others. Regardless of the outcome of this taxonomic debate, it should be agreed by all that 'wetlandicus' (for the Pariette Wetlands) is probably the most ridiculous Latin name ever concocted for a cactus (the plant grows on gravelly terraces, not in wetlands). Photo by Tony Frates.

No Surface Occupancy stipulations for ongoing drilling. Pariette cactus is further threatened by drought, hybridization with sympatric populations of *S. wetlandicus*, and other biological problems associated with small populations.

Genetic and morphological studies by Porter and colleagues have demonstrated consistent, albeit cryptic, differences between *Sclerocactus glaucus* populations in western Colorado and Utah. The Utah plants were given the unfortunate name *S. wetlandicus* by Hochstatter and differ from true *S. glaucus* (considered endemic to Colorado) in the ornamentation of the seed wall. Both *glaucus* and *wetlandicus* are more widely distributed and abundant (each estimated at about 10,000-16,000 and 7000-13,000 individuals, respectively) than *S. brevispinus*, though both still have relatively small global ranges. Both of these species are also under threats from oil and gas development, illegal collection, habitat fragmentation, and ORV recreation. The significance of these impacts will be assessed during the 5-year review to determine whether continued protection and listing under the Endangered Species Act is warranted for each of these species.

As part of the review process, the Fish and Wildlife Service is soliciting information and comments from the public for 60 days, ending on 12 February 2007. Specifically, service biologists are looking for new information on the distribution, abundance, trends, demographics, and genetics of these three cactus species, as well as data on habitat condition, threats, and recent conservation measures. Comments can be submitted to: Field Supervisor, Utah

Ecological Services Office, US Fish and Wildlife Service, 2369 West Orton Circle, Suite 50, West Valley City, UT 84119 or emailed to <mailto:fw6_sclerocactus@fws.gov>fw6_sclerocactus@fws.gov.

For more information, see US Fish and Wildlife Service 2006. Endangered and Threatened wildlife and plants; 90-day finding on a petition to remove the Uinta Basin hookless cactus from the list of Endangered and Threatened plants; 90-day finding on a petition to list the Pariette cactus as Threatened or Endangered. *Federal Register* 71 (240):75215-75220. – Walter Fertig

Celebrating Wildflowers Website: The US Forest Service's Celebrating Wildflowers website has been revised with new photos and links to recommended scenic hikes and wildflower viewing sites across the country. Take a look at <http://www.fs.fed.us/wildflowers/index.shtml>. Click on the Intermountain Region to locate sites in Utah's national forest lands.

Noteworthy Discoveries:

Golden tickseed (*Coreopsis tinctoria* var. *tinctoria*) new to Utah

Coreopsis tinctoria var. *tinctoria* is native to the Great Plains but has become widely naturalized in western North America as an escaped garden plant. I located a population of this yellow-rayed member of the sunflower family at Sand Spring on the eastern edge of Coral Pink Sand Dunes on 26 July 2006. *C. tinctoria* has not previously been reported for Utah or Kane County. The plants were found on moist sandy soil at the fringe of a wet meadow community bordering a small spring about 7 miles WNW of Kanab and 5 miles N of the Arizona state line. – Walter Fertig

Below: *Coreopsis tinctoria* from Sand Spring, Kane Co., Utah, 26 July 2006 (Fertig 22681 BRY, NY to be deposited). Photo by W. Fertig.





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Sego Lily

Newsletter of the Utah Native Plant Society

March 2007 Volume 30 No. 2

No Listing for Two Rare Utah Plants

USFWS to drop Deseret milkvetch and Graham's penstemon from the Threatened and Candidate lists

By Walter Fertig

Two of Utah's rarest native plant species will not be protected under the Endangered Species Act (ESA) as a result of two rulemaking decisions by the US Fish and Wildlife Service (USFWS) in mid-December and late January. Graham's penstemon (*Penstemon grahamii*) had been proposed for listing as a Threatened species under the ESA in January 2006 following a court settlement between the Service and several conservation groups, including the Center for Native Ecosystems (CNE) and the Utah and Colorado native plant societies. On December 19, 2006, USFWS withdrew the listing proposal, citing a lack of imminent threats. In a separate decision, dated January 25, 2007, USFWS announced its intention to remove Deseret milkvetch (*Astragalus desereticus*) from the Threatened species list, citing a reduction in threats due to a new Conservation Agreement reached between the Service and the State of Utah. This new ruling came in response to another legal challenge from CNE, Forest Guardians, and the Utah Native Plant Society calling for USFWS to designate Critical Habitat for the plant*.

Continued on page 4.



Graham's penstemon by Kaye Thorne

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* Critical Habitat is defined in the Endangered Species Act as the specific geographic areas that contain features essential to the survival of a listed species and which may require special management attention. The Service is required to evaluate critical habitat when listing a species but may decline to designate such areas if doing so draws unwanted attention to the location of a species (resulting in vandalism, poaching, or other heightened threats) or will not otherwise benefit the species.



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Sego Lily Editor: Walter Fertig (walt@kanab.net). Articles, photos, and illustrations from members are welcome and encouraged. The deadline for the May 2007 Segó Lily is 15 April 2007.

Website: For late-breaking news, the UNPS store, the Segó Lily archives, Chapter events, links to other websites (including sources of native plants and the digital Utah Rare Plant Field Guide), and more, go to unps.org. **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

Chapter News and Events

Cache: The Cache Chapter of UNPS, Cache County Extension, and Master Gardeners of Cache Valley will be holding three sessions of the Waterwise/ Native Plant Propagation Workshop on Saturday March 3rd (9-11 AM and 1-3 PM) and Thursday, March 8th (6-8 PM). Attendees will learn to grow waterwise and native Utah plants from seed and cuttings. Participants will also receive one flat of 72 plants, and the information to grow these plants in their landscape. Cost is \$15 for UNPS or Master Gardener members, \$20 for everyone else. Pre-registration is required with Cache County Extension at (435)752-6263. The workshop will be held at the USU Teaching Greenhouse, 1389 North 800 East, Logan, UT - Corner of 800 East and 1400 North

Among the plants this year are: *Acer grandidentatum*, *Aquilegia flavescens*, *Arctostaphylos nevadensis*, *Artemisia ludoviciana*, *Astragalus utahensis*, *Iliamna rivularis*, *Iris missouriensis*, *Linum kingii*, *Mahonia repens*, *Penstemon eatonii*, *Penstemon whippleanus*, *Petrophyton caespitosum*, *Sphaeralcea caespitosa*, *Sporobolus cryptandrus*, and others. - Steve Ripple

Escalante (Garfield County): In December we had the chapter holiday party at the home of Larry and Louise Barnes. The location was lovely, the food great, and we had a good turnout, with members donating canned and non-perishable food for the local food bank.

Molly Waters, former UT Dept of Water Resources Conservation Program Director, presented a program on Utah's Water Conservation efforts for our January meeting. She discussed Utah's Waterwise plant program and how the state determined to focus a portion of it's approach on water conservation on home landscapes. Molly shared several of the State's water conservation publications and brochures with the chapter.

In February, Carolyn Shelton (Interpretive Specialist for Grand Staircase-Escalante National Monument) presented a lively and engaging, pre-Valentine's Day program on Plant Reproduction (aka 'Sex in the Garden'... can we say that?) using cut flowers and other hands-on props. - Allysia Angus

Manzanita (Kane County): Becky Mann of the USGS gave a presentation on techniques and applications of monitoring rare plant populations to kick off our January meeting. On February 12, the Kanab group held its first plant propagation workshop, spearheaded by Holly Beck (botanist, Grand Staircase-Escalante NM) and Cheryl Decker (horticulturist and restoration biologist for Zion National Park). The event drew 47 people, of which more than half were not current members. Those in attendance were treated to seeds, containers, and useful tips from the experts. Our next meeting will be on Monday, March 12th and feature Carolyn Shelton on the topic of creating a personal nature journal. - Walter Fertig

Salt Lake: On February 7th, Tony Frates, Conservation Co-chair of UNPS, gave a presentation titled "Saving Utah's Native Plants: rare, medium rare, and

rare, and the rarely rare." Tony has spent countless hours fighting on behalf of Utah's most endangered plant species, particularly several in Washington County and the Uintah Basin. We met in our new location in the Wasatch Board Room at REI.

March Meeting: Wednesday, March 7th, 7 PM, Wildflower Photography Workshop. Mr Ray Taggart, owner of Pixel's Foto and Frame Shop in Sandy, will present a program on the fundamentals of digital photography and its application in wildflower photography. Following, Dr. Paul Zuckerman will give a brief presentation on the use of alternate lighting.

Sunday, March 18th, 1-3:00 PM, Stansbury Island Field Trip: Join us in search of *Ranunculus andersonii*, *Fritillaria pudica*, *Cymopterus purpurascens* and other early blooming treasures. Directions: Please contact Kipp about car-pooling, or to get detailed instructions if you have to go independently.

April Meeting: Wednesday, April 4th, 7PM Amber Richman, USDA-APHIS-PPQ Biological Control will discuss various biocontrols used on several invasive species in the state of Utah. She will talk about how biocontrols are tested before being released and the impacts that they have on the environment.

We will begin weekly wildflower hikes this month on Saturday mornings around 10 AM. Locations will be announced on the website and chapter newsletter.

Chapter Officers: Kipp Lee - President, Liz Schubert - Communication, Paul Zuckerman - Treasurer, Richard Jonas - Education, Paul Daniels - Invasive Species. For information about meetings email Liz Schubert at Liz@utahrox.com. For membership information email Kipp Lee at kipp_lee@comcast.net.

Southern (Washington County): On Sat. Feb. 3 the Southern Chapter/Zion Canyon Field Institute held a very successful propagation workshop at the greenhouse in Zion. Fifteen (the maximum) were signed up, and 4 more "walk-ons" were also accommodated, as we had made up a few extra planters. The seed was all locally collected. Rick Heflebower was the instructor; he gave an excellent run-down on the species provided, and there were lots of questions and answers. All seemed to enjoy themselves very much, and left with happy smiles on their faces.
- Margaret Malm

UNPS News and Upcoming Events

Life Member Update: Lois Arnow (co-author of Flora of the Central Wasatch Front, Utah grass expert, and eternally commemorated by *Poa arnowiae* and *Stipa arnowiae*) became our 27th lifetime member in January of this year.

Sixth Annual Utah Rare Plant Conference: Red Butte Garden and UNPS are co-sponsoring the annual UT rare plant meeting on Tuesday, March 6th in Salt Lake City from 10 AM to 5 PM. The agenda will feature an array of speakers discussing research on Utah rare plants and other topics pertaining to plant

conservation. Space is limited, so if you are interested in attending please contact unps@unps.org for more information.

UNPS Spring Conference in Kanab: The Manzanita Chapter will be hosting the state board meeting on the weekend of May 18-20. In conjunction with this event, the chapter will also be sponsoring an evening lecture/dessert social on the evening of Friday, May 18, followed by morning field trips on Saturday, May 19 and Sunday, May 20 to outstanding botanical areas of the Grand Staircase-Escalante National Monument. The board meeting itself will be held in the afternoon of May 19. All of these events are open to any members of UNPS and their friends. Look for more details in the May *Sego Lily*. - Walter Fertig

Utah Native Plant Propagation Workshop: Saturday, March 17, 2007. 8AM -12Noon. Salt Lake County USU Extension, 2001 S. State St., Salt Lake City. Room S-1007/8. Open to UNPS, INPGA, or WRGS members only. For every 2 flats you plant for a Fall 2007 workshop, plant one for yourself FREE! Containers provided or wash your previously-used Rootainers and bring them with you - fill them with fresh sterile media at the workshop, then plant your seeds. You may bring seeds to share or plant for yourself. The following seed will be provided: pinyon pine, Utah juniper, fernbush, apache plume, Great Basin wildrye, desert four o'clock, yucca sp., Palmer penstemon, Rocky Mtn penstemon, blue grama grass, silver buckwheat. Plus, limited quantities of green mormon tea, Indian ricegrass, little bluestem, chokecherry, firechalice, purple crazypea, meadow fire, and more. Please register with Maggie Wolf, 801-468-3171 (leave name and contact info on voice mail) or by e-mail at maggiew@ext.usu.edu. - Maggie Wolf

Purge your Spurge! Myrtle Spurge/Native Plant Exchange: This April, don't miss out on a great opportunity to purge your spurge and rid your garden of myrtle spurge (or as some call it donkey tail spurge) and receive free Utah native plants in exchange! Myrtle spurge (*Euphorbia myrsinites*) is a non-native, highly invasive, garden plant that is rapidly spreading in our foothills and canyons, crowding out the native vegetation.

Join the Bonneville CWMA, the Great Salt Lake RC&D, and the Salt Lake Soil Conservation District, along with volunteers from the Intermountain Native Plant Growers Association and the Utah Native Plant Society, at the Millcreek REI as we work to protect our canyons by preventing the spread of myrtle spurge in our foothills.

On April 14 & 21, 2007 bring your bagged myrtle spurge to REI at 3200 East 3300 South, where volunteers will be on hand to take your plants and give you up to five potted Utah native plants in exchange. In addition, receive a planting guide and learn about noxious and invasive species in Salt Lake and what you can do to help prevent their spread.

For more information contact Salt Lake County Weed Program staff at 801-468-2861 or on the web at www.weeds.slco.org - Sage Fitch

No Listing for Two Rare Utah Plants [continued from page 1]

Graham's Penstemon: a Candidate No More

Graham's penstemon is a low-growing perennial with exceptionally large (up to 1 ¼ inches), tube-shaped lavender flowers. *Penstemon grahamii* is currently known from 5 extant population clusters containing a total of 6200-7000 individuals across the Uinta Basin in Duchesne, Carbon, Uintah (UT) and Rio Blanco (CO) counties. This species is restricted to sparsely vegetated whitish shale barrens and knolls of the Green River Formation.

Penstemon grahamii has been of conservation concern since the 1970s due to its unfortunate habit of growing on geologic formations rich in oil, natural gas, and oil shale. At present, 63% of all known *P. grahamii* subpopulations are leased for oil and natural gas drilling or are within active fields and 88% of all populations occur within active seismic exploration areas. The 2005 Energy Policy Act and other changes in Bureau of Land Management (BLM) policy to promote energy development on federal lands will only enhance mineral exploration and development in the basin over the coming decades. BLM is responsible for most of the lands or mineral resources under development and has attempted to minimize direct impacts on penstemon habitat by regulating the location of well pads, access roads, pipelines, and other infrastructure. There are, however, many secondary effects of mineral development, including habitat fragmentation, increased spread of noxious weeds, and reduction of pollinator populations that may place additional stress on this species.

By far the greatest potential threat to Graham's penstemon is development of oil shale (or kerogen). The Green River Formation of NE Utah, NW Colorado, and SW Wyoming has the world's largest known deposits of oil shale – an estimated 1 trillion barrels. Interest in processing oil shale into more conventional petroleum products peaked in the late 1970s in response to the energy crisis and government research and development incentives. Reaching the kerogen-rich deposits has typically involved open pit mining in which the overburden of rock, soil, and vegetation is removed. To date, extensive development of oil shale has been stymied by high production costs and the ready availability of more accessible and profitable oil and natural gas reserves in the Uinta Basin. This could change quickly, however, if rising oil prices or technological breakthroughs make oil shale economically competitive. An analogous situation existed with coalbed methane reserves in the west until a cost-effective extraction method was discovered in the 1990s that made methane production highly profitable. The ensuing production boom has vastly outstripped the ability

of federal agencies to cope with the resulting impacts.

Several other threats were identified in the Service's January 2006 listing proposal. A recent pollination biology study by Red Butte Garden found that impacts of sheep grazing on flower and seed production were significant. The large, showy flowers and rarity of Graham's penstemon make it desirable to penstemon fanciers and thus vulnerable to over-collection of live plants or seed (as a group, penstemons are among the most sought out native plants by collectors after cacti and orchids). Lastly, Graham's penstemon receives no formal protection under state or federal law (although it remains listed as Sensitive by the BLM) and none of its habitat is permanently protected in a designated protected area.

Despite these impacts, the USFWS ruled in December that Graham's penstemon was not sufficiently threatened to warrant listing under the Endangered Species Act. This ruling also removes the species from the service's roster of official candidate species. While candidate status does not confer any official protection under the ESA, other federal agencies traditionally afford candidates extra management attention so that government actions do not further imperil the species. USFWS relied heavily on comments provided by BLM and industry that downplayed the threats from mineral development and exploration. BLM noted that its existing regulations protect Graham's penstemon from direct harm by new oil and natural gas wells and pipelines, and that as a Sensitive species it will continue to receive sufficient management attention. Impacts from oil shale development were considered unlikely in the next two decades due to low interest from industry under current economic conditions. Even if development were to accelerate, the BLM noted that the prime areas for oil shale development are in the Piceance Basin of Colorado, beyond the known range of this species. The Service also dismissed other identified threats from its own January 2006 proposal as not being significant or imminent. USFWS is pursuing a Conservation Agreement with the BLM to promote conservation actions that, if followed, would be sufficient to preclude future listing.

Deseret Milkvetch: Delisting in the Works

Deseret milkvetch (*Astragalus desereticus*) is a low-growing, nearly stemless, white-flowered member of the pea family with distinctive woolly fruit pods borne on elongated stalks. This species was first collected in the 1890s but remained unnamed until its unique characteristics were recognized by legume expert Rupert Barneby in 1964. Deseret milkvetch was thought to be extinct until 1981, when it was rediscovered near Birdseye (Utah County) by Elizabeth Neese. Deseret milkvetch is known from a single population on a steeply sloping conglomerate lens of the Moroni Formation. The entire population

(estimated at 5000-10,000 plants) is found on private and state lands in the Northwest Manti Wildlife Management Area (managed by the Utah Division of Wildlife Resources [UDWR]) and is mostly within 300 yards of US Highway 89.

Due to threats from potential highway expansion, urban sprawl, and herbivory and trampling by livestock and wildlife, Deseret milkvetch was listed as Threatened by the USFWS in October 1999. At the time of listing, the Service declined to designate critical habitat, citing that such an action would not directly benefit the species. This failure was legally challenged in July 2005 and in a settlement USFWS agreed to submit a new critical habitat designation by January 2007. At the deadline, USFWS again ruled that no critical habitat was necessary. More significantly, the service announced that it would pursue delisting of Deseret milkvetch due to a reduction in threats to the species following establishment of a Conservation Agreement with the state of Utah (representing the UDWR, UT Department of Transportation, and UT School and Institutional Trust Lands Administration).

What Happens Next?

The decision to withdraw Graham's penstemon is final and took effect on December 19, 2006. Delisting Deseret milkvetch is a proposed rule and the Service is soliciting additional information and comments through March 26, 2007.* As of this writing, additional legal appeals are probable for the Graham's penstemon but have not been filed. Legal challenges may also ensue if Deseret milkvetch is officially delisted.

Graham's penstemon and Deseret milkvetch are the latest in a series of rare plant and animal species that have been denied ESA protection by the USFWS. In recent years the Gunnison sage grouse (known from 4000 individuals in SW Colorado and adjacent UT), Gunnison's prairie dog (90% loss of historic range), and at least 9 other species have been denied listing protection based on decisions by high level Department of Interior officials that reversed the recommendations of USFWS's own field staff. The Union of Concerned Scientists in 2005 released a survey of USFWS scientists that documented pervasive political interference from Washington in scientific decisions. In the case of Graham's penstemon, USFWS ignored the findings of all three of its outside reviewers in support of the January 2006 listing proposal, instead drawing heavily on input from the BLM and industry to forgo listing (the BLM would be the agency most affected by listing).

* Written comments can be sent to Larry England, US Fish and Wildlife Service, 2369 West Orton Circle, Suite 50, West Valley City, UT 84119 or by email (larry_england@fws.gov). Email comments should include the tagline "Attn: Astragalus desereticus". All comments are considered part of the public record, although you may request anonymity.



Above: Deseret milkvetch (*Astragalus desereticus*) by Kaye Thorne.

Increasingly, USFWS is turning to Conservation Agreements as a tool to promote tangible conservation actions and avert listing. Conservation Agreements are formal agreements between the Service and private landowners or government agencies in which all parties agree to voluntarily conduct conservation measures that will reduce threats or improve population conditions so that listing under the ESA is less likely. Typically conservation agreements are drafted while species are still at the candidate stage of the listing process. Implicit in all agreements is the threat that failure to implement conservation actions may lead to listing and full protection under the ESA. Ideally, the Conservation Agreement for Graham's penstemon will institute some of the conservation measures needed for this species, but if the signatories fail to fulfill their obligations the 'club' of potential listing will be more difficult for USFWS to wield, as *P. grahamii* now has no candidate status. Likewise, the regulatory club of listing will be removed for *Astragalus desereticus* even before compliance with the Conservation Agreement has been confirmed.

Regardless of whether these species are formally listed or more informally covered by Conservation Agreements, several conservation actions will need to be undertaken in the coming years to ensure that these two rare Utah plants continue to survive. Updated status surveys are badly needed for Graham's penstemon throughout its range (some populations have not been resurveyed since the early 1980s). Recent research on pollination biology and life history, initiated by Red Butte Garden, needs to continue. Additional monitoring is needed to quantify impacts and assess population and habitat condition trends. Developments in the oil shale industry also need to be carefully followed to assess if threats from exploration are realized. For Deseret

milkvetch, additional monitoring data are needed to determine whether population increases detected in 2005 represent positive long-term growth and response to management changes or were influenced by atypically wet weather that year. The performance of USFWS and the state of Utah in meeting the obligations of the Conservation Agreement also needs to be vigilantly scrutinized.

It is ironic that legal 'victories' over USFWS have so far resulted in a net reduction in protection for these two species. Although further appeals may be successful (courts typically take a dim view of their decisions being ignored), the strategy of legal challenges to USFWS over the remainder of the Bush administration may not be worth the unintended consequences. Until a more favorable administration is in place, Utah conservationists might be better off pursuing their goals through more collaborative methods, such as funding or conducting necessary survey and monitoring work, contributing expertise to the development of Conservation Agreements, or providing educational outreach. After all, our goal is to help plants like Graham's penstemon and Deseret milkvetch, not inadvertently bring them greater harm.

Rare Utah Cactus Turns Up at Salt Lake Chapter Meeting

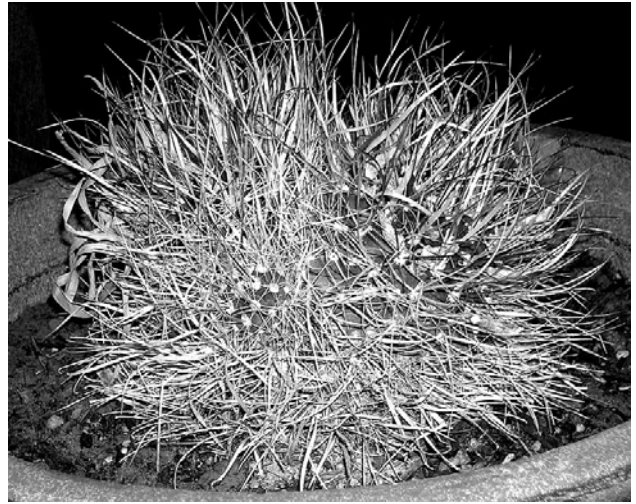
By Dorde W. Woodruff

Those of us who watch for such things have been noticing a page on the website of the Cactus Art Nursery in Ravenna, Italy, which posts a large collection of cactus photos*. This particular website has photos of the habitat and individuals of a rare western cactus named *Sclerocactus blainei*, or *S. spinosior* ssp. *blainei*. The photos were taken by Fred and Judy White near Cedar City, Utah. The desert slopes look like our West Desert; I assumed the location was in western Iron County (near Nevada), where this taxon is better documented.

Fred White turned up at the December meeting of the Salt Lake Chapter with these very plants. That the cacti came from the NE edge of Cedar City itself was a surprise. Fred salvaged them from private land when they were soon to be overrun with house construction (which has now happened).

Blaine's fishhook cactus is barely documented from Utah. There are no Utah specimens at the major state herbaria, as of when I visited them in 2005-2007. One collection by Joseph Busek is at the herbarium of San Juan College in New Mexico.

* see www.cactus-art.biz/schede/SCLEROCACTUS/Sclerocactus_spinosior/Sclerocactus_spinosior_blainei_Iron_Co_UT/Sclerocactus_spinosior_ssp_blainei_Iron_Co-UT.htm for this webpage.)



Above: Blaine's fishhook cactus. Photo by D. Woodruff.

Nevada's Rare Plant website lists it as questionable in Utah. Utah's Rare Plants website doesn't list it at all. Heil and Porter's revision of *Sclerocactus* from *Haseltonia* (1994) cites the Busek specimen. Although Welsh and Thorne described the taxon in *Great Basin Naturalist* in 1985 from Nevada, the 2003 revision of *A Utah Flora* doesn't mention it for Utah. The cactus is named after Stan Welsh's son Blaine who used to do fieldwork with him. Cactophiles who specialize in rare plants, and drive and hike many miles to find them, didn't expect it at Cedar City.

Sadly, it may not be there any more. Fred reports that he and Judy searched extensively and didn't see any more (besides the ones they rescued). Based on geology maps, the Cedar City population apparently occurred on Navajo sandstone, another surprise since it is reported from calcareous or igneous soils in the Bonneville Basin. Little Navajo sandstone is exposed in the Cedar City area, so chances of finding another colony are not good if it is indeed restricted to this substrate there.

Some workers consider *S. blainei* to be no more than a variety of the closely related *S. spinosior* (which has more and longer spines and larger plant bodies and flowers). It may not be so uncommon as supposed from the lack of documentation. According to D. Ferguson (quoted on the TRAFFIC website, 2002) "[t]reatment of *S. spinosior* ssp. *blainei* as a discrete taxon is questionable. It may be an erroneously defined variant of *S. spinosior* that replaces the nominate variety in south-west Utah and Nevada. *S. spinosior* comprises a number of regional and local forms, which may result in multiple taxonomic treatments and potential confusion ... the species is purportedly locally common and occurs in widely scattered populations in Iron County, Utah, where thousands of specimens have been observed." However, many *Sclerocactus* populations suffered terribly due to the 2002 drought; the condition of the populations in western Iron County at this time is unknown.

Utah State University and Utah Botanical Center Work to Boost Native Plant Seed Supplies for Commercial and Conservation Purposes

By Maggie Wolf, UNPS Horticulture Committee Chair

Increasingly appreciated for their drought-tolerance, benefits to wildlife, and natural beauty, Utah native plants are sought for revegetation projects as well as suburban landscapes. Ecologists and landscapers are often limited to seed and/or plants that are commercially available; non-native species are usually planted out of necessity. To help promote and increase native plantings, Utah State University (USU) and the Utah Botanical Center (UBC) cooperate in the Great Basin Native Plant Selection and Increase Project (GBNPSIP).

At the Utah Botanical Center several ongoing projects work towards making Utah's native plants more available. Besides the GBNPSIP, Anderson grows several Utah's Choice species in "seed increase" plots. Some of the seed produced there will supplement the Intermountain Native Plant Growers Association's (INPGA) seed bank, a collection of 42 species.

As Utah's land grant institution, USU has a long tradition of helping farmers improve their productivity and profitability. Through the GBNPSIP, USU hopes not only to increase native plant seed availability but also to open new crop opportunities for Utah's dryland farmers.

"We're evaluating the cultural requirements for field production," explains Richard Anderson, UBC Nursery and Greenhouse Manager. By discovering how much irrigation, fertilization and pest control are required for profitable seed production, Utah farmers are more likely to expand their farm operation by growing native plant seed. "Ultimately, we're trying to produce more native plant seeds for conservation and commercial purposes," Anderson says.

Another aspect of increasing native plant seed production is quality control. Michael Bouck, a Research Associate at Utah State University, supervises the Seed Certification Program for the Utah Crop Improvement Association. Native plants species, he notes, have highly variable characteristics depending on where the seed was grown.

"One of the things we struggle with is that the plants we grow from seed will perform to consumer's expectations. Seed from plants growing outside Utah may not survive as well or even look the same as plants grown from Utah seed. Some plant species seem to be very site-sensitive," Bouck

says. Certified seed must conform to standards set by the Association of Official Seed Certifying Agencies.

"Utah leads the industry in wildland-collected seed," says Bouck. "We certify seed as "source-identified" once we verify the species and seed collection site." Most of this seed is used in wildland revegetation projects.

At the Utah Botanical Center, several ongoing projects work towards making Utah's native plants more available. Besides the GBNPSIP, Anderson grows several Utah's Choice species in "seed increase" plots. Some of the seed produced there will supplement the INPGA seed bank. The UBC also aims to grow native plants for demonstration purposes, so that the general public can witness our native plants' beauty first-hand.

Related links: Utah Botanical Center, at <http://utahbotanicalcenter.org>.

Utah Crop Improvement Association, at <http://www.utahcrop.org>

Utah's Choice and Intermountain Native Plant Growers Association, at <http://utahschoice.org>

Utah State University, at <http://www.usu.edu>
Great Basin Native Plant Selection and Increase Project, at http://www.nsl.fs.fed.us/great_basin_native_plants.html

Utah Heritage Gardens - where are they now?

If you are or were instrumental in one of the UHG's featured on the UNPS website, please contact Maggie Wolf, UNPS Horticulture Committee Chair, 801-468-3171 or maggiew@ext.usu.edu. I will be visiting existing UHG's and seeking out new sites. If you know of a native planting that is accessible to the public and is not currently listed as a UHG, please let me know about it. Seeing is believing; help Utahns recognize and appreciate Utah native plants by supporting this program. – *Maggie Wolf*

Department of Corrections: In my haste to get the January *Sego Lily* to the printers before Christmas, I made several errors in proofing Therese Meyer's *Sphaeralcea* article. The photo of a field of globemallows at the top of page 9 should have been attributed to Tana Pitts. I neglected to give Therese Meyer credit for the leaf drawings accompanying each of the species descriptions. Lastly, the article itself came from a presentation given by Dr. Michael Piep of Utah State University to the Seed Collectors Workshop of 22 September 2005. My apologies to Tana, Therese, and Michael for the errors. – *Walter Fertig*



Talinum brevifolium. This photo was taken in Capitol Reef NP. The population found in Arches NP had white flowers.

Veg Mappers Find “New” Plants for Utah National Parks

Text and photo by Sarah Topp

What goes on behind the scenes in your national parks? Park visitors see rangers, interpreters, and other helpful people at the entrance booths and visitor centers. But public service is only part of the picture, and research activities are generally not well-publicized. Moab is home to the Southeast Utah Group (SEUG), which functions, in part, as the resource management arm for Arches and Canyonlands National Parks, and for Natural Bridges and Hovenweep National Monuments. Part of what SEUG does is inventory and monitor plant and animal populations. As part of this larger program, plant inventory has been conducted in these parks, and in additional parks on the Northern Colorado Plateau, including (in Colorado) Dinosaur, Black Canyon of the Gunnison, and Colorado National Monuments, and (in Utah) Cedar Breaks National Monument, and Bryce Canyon and Capitol Reef National Parks.

During the 2006 field season, the inventory crew (also known as veg mappers) worked in Arches and Bryce Canyon National Parks. The goal of veg mapping is to create a comprehensive map of plant associations commonly found growing together across the park landscape, for example, Ponderosa pine and manzanita, a common forest type on the Paunsaugunt Plateau in Bryce Canyon NP. Typically, certain plant species are often found growing together based on factors such as soil type, aspect, elevation and fire history. The veg mapping crew collects data in the field, visiting several hundred sample sites having various combinations of these factors within each park. Once data are analyzed and photo interpretation completed, the vegetation map will provide information designed to assist resource managers in a variety of ways, as well as serving as a baseline for monitoring change over time.

Each park has a list of plants considered “present in the park” and this list is backed up by voucher specimens for every species, housed in each park’s herbarium. Our friend and advisor, Walt Fertig, compiled the current lists through a series of herbarium reviews for several parks over the last few winters. Walt also confirmed the identification of all the specimens subsequently collected. Each park’s herbarium serves then, as a museum and also as a reference point for future botanical researchers interested in identification and location information of plant species found within the park. Over time, populations of species may increase in size, remain virtually the same, or may disappear altogether, for various reasons.

Under the guidelines of our research permit, we were authorized to make collections for the herbarium of plant species not already represented in the herbarium with a voucher. These plant finds are considered “new” plant records for the park, although not necessarily new to science.

In 2006, the park service crew consisted of four people, often working in remote areas of the parks. Traveling cross-country, using aerial photographs, satellite imaging and GPS units, the crew found and made collections of 61 new species, including 5 new families, and several new genera within families already represented. Of these 61 species, 48 are natives and 13 are non-natives.

The crew worked in Arches NP during April and May, where we found 41 new species records. Four species represented new genera, and one, *Talinum brevifolium*, introduced a new family for the park, Portulacaceae, the Purslane Family. Sausage-leaf talinum grows in sandstone depressions and crevices primarily in the southeastern counties, and was found in a remote area of the park overlooking Clover Canyon. Another new species, *Asclepias ruthiae* (Ruth’s milkweed), is uncommon and previously was known in Grand County from just a couple of records - one from the early 1980’s and one from the mid 1990’s. This small milkweed was found in an area where grazing had occurred previous to the park’s establishment.

The months of June, July and August were spent working in Bryce Canyon NP where we found 30 new species for the park. The most interesting Bryce Canyon finds were in the Chenopodiaceae (Goosefoot Family). These plants are commonly found on saline, shaley and silty soils in what are generally thought of as “wastelands” or “badlands”. On the Tropic Shale Formation in Bryce Canyon NP, we found 7 new species in the Goosefoot Family. This soil type is uncommon in Bryce Canyon, which has soils predominantly derived from limestone; due to their unique photo signature, we targeted these sites for our inventory work. A couple of our more common shrubs, *Sarcobatus vermiculatus* (greasewood), and *Atriplex confertifolia* (shadscale) were among the new finds. A less common shrub,

Zuckia brandegeei (siltbush) is certainly one of the more graceful members of this family.

Near the southern end of the park, 2 new families were added for Bryce Canyon. One, Typhaceae (Cattail Family), was represented by the broad-leaved cattail, *Typha latifolia* which was flourishing along the edges of a remote spring. The other new family, Hydrophyllaceae (Waterleaf Family), was represented by a robust *Phacelia mammillariensis* found growing on a steep adobe hillside.

I wondered how so many new plant species could be found in parks that are 40+ years old. The explanation is probably a combination of things: a lack of funding for botanical research, being in the right place at the right time (especially where the fleeting period and irregular blooming cycles of annuals is concerned), travel to remote sites within the parks, and the possibility of new arrivals, especially in areas of high traffic where more “weedy” species may be introduced over time. In Arches NP, the new finds along the Colorado River corridor may have been due to timing, as we surveyed there in August when the water was low with easy shoreline access. In any case, it was very exciting and rewarding for everyone involved, and we are looking forward to more discoveries in future years.

Sarah Topp (*scarletgilia@hotmail.com*) lives in Moab, UT, and currently works on the Inventory and Monitoring Program for the National Park Service.

New Vascular Plant Records from Arches and Bryce Canyon National Parks – 2006

Nomenclature follows Welsh et al. (2003) *A Utah Flora, third edition*. All specimens are deposited in the ARCH or BRCA herbaria.

Arches National Park

Aegilops cylindrica (Fertig 22651)
Amaranthus retroflexus (Fertig 22998)
Asclepias ruthiae (Topp ST05180601)
Aster hesperius (Fertig 22992)
Bassia scoparia (Moran s.n.)
Bothriochloa ischaemum (Moran s.n.)
Bromus japonicus (Topp ST08080602)
Calamagrostis scopulorum (Fertig 22994)
Chamaesyce glyptosperma (Fertig 22991)
Chloris virgata (Moran s.n.)
Chorispora tenella (Topp ST05070603)
Chrysothamnus nauseosus var. *consimilis* (Fertig 22993)
Cyperus esculentus (Fertig 23008)
Datura wrightii (Topp ST05090601)
Descurainia sophia (Topp ST05070601)
Digitaria sanguinalis (Fertig 22999)
Elymus cinereus (Topp ST08080606)
Eremopyrum triticeum (Topp ST04210602)
Eriogonum inflatum var. *fusiforme* (Fertig 22658)
Festuca pratensis (Fertig 22653)
Gaillardia pulchella (Fertig 22996)
Galium aparine var. *echinospermon* (Topp ST05020602)
Galium multiflorum var. *multiflorum* (Topp ST08080601)
Hibiscus trionum (Fertig 23006)



Asclepias ruthiae. Voucher specimen deposited in Arches NP herbarium.

Juniperus scopulorum (Fertig 22646)
Lactuca serriola (Topp ST05200602)
Lepidium moabense (Moran s.n.)
Lythrum salicaria (Topp ST08230601)
Munroa squarrosa (Fertig 22997)
Oxytenia acerosa (Fertig 23000)
Panicum obtusum (Topp ST08220607)
Panicum virgatum (Fertig 22648)
Philadelphus microphyllus (Topp ST05150602)
Physalis longifolia (Fertig 23007)
Polygonum lapathifolium (Topp ST080605)
Populus x intercurrents (Topp ST05020604)
Scirpus maritimus (Topp ST08230603)
Spartina gracilis (Topp ST08070601)
Spartina pectinata (Topp ST08230605)
Talinum breviflorum (Topp ST05200601)
Tridens muticus (Topp s.n.)

Bryce Canyon National Park

Arabis selbyi (Topp ST06150604)
Aster hesperius (Topp ST07290601)
Atriplex confertifolia (Ballenger EB07270601)
Atriplex powellii var. *powellii* (Topp ST07280604)
Bassia scoparia (Topp ST07280609)
Carex duriuscula (Topp ST06140601)
Carex interior (Topp ST07290601)
Carex pellita (Topp ST06290603)
Chrysothamnus linifolius (Topp ST07280601)
Chrysothamnus nauseosus var. *gnaphalodes* (Fertig 23060)
Cirsium scariosum var. *scariosum* (Topp ST07160602)
Cleomella palmeriana var. *palmeriana* (Topp ST07280602)
Distichlis spicata (Topp ST07280606)
Elaeagnus angustifolia (Topp ST06150603)
Halogeton glomeratus (Topp ST07280611)
Opuntia fragilis (Topp ST06140601)
Phacelia mammillariensis (Topp ST06150606)
Populus x intercurrents (Topp ST06150601)
Potentilla pensylvanica (Topp ST06280602)
Salix eriocephala var. *watsonii* (Topp s.n.)
Sarcobatus vermiculatus (Topp ST06290601)
Senecio hydrophilus (Ballenger EB07290601)
Spartina gracilis (Topp ST06150607)
Sporobolus cryptandrus (Topp ST07290602)
Suaeda torreyana var. *torreyana* (Topp ST07280605)
Thelypodopsis sagittata var. *ovalifolia* (Topp ST07110601)
Thlaspi montanum var. *montanum* (Fertig 22534)
Typha latifolia (Ballenger EB07290602)
Ulmus pumila (Fertig 22543)
Zuckia brandegeei var. *plummeri* (Topp ST07280608)

Seed Dormancy and Native Plant Propagation

By Doug Reynolds
Pinyon51@yahoo.com

To germinate and establish, seeds need four things: Water, oxygen, appropriate temperatures, and light. Seeds of most horticulturally important species have been selected by growers to germinate quickly the first time these factors are present; take most garden variety seeds from their package, put them in a pot of soil on a sunny, warm windowsill, and you get a high percentage of germination within a few days. Seeds of many of our native species, however, show dormancy, which can simply be defined as not germinating initially when good growing conditions are present. In some species that ripen seeds late in the season, the cold temperatures of fall prevent germination. But many species produce mature seeds in summer when conditions are favorable for some growth but not for the completion of their lifecycle. We believe that dormancy mechanisms evolved to allow species to time their germination to periods when successful growth and reproduction are most likely. One can imagine that plants whose seeds germinated on an unusually warm October day would be killed by subsequent frost and disappear from the population compared to plants whose seeds delayed germination until the first warm days of spring.

Dormancy mechanisms can be simply classified into two categories, mechanical or chemical. In mechanical dormancy the seed coat prevents water and/or oxygen from reaching the embryo and associated tissues inside to stimulate development. This mechanism is often present in seeds with hard, thick coats or shiny seed coats with an impervious waxy coating. In nature, this resistant seed coat prevents germination until time has passed and the seed coat has been broken down by abrasion, freezing and thawing, or the action of soil microorganisms. Not only does this delay germination immediately after the seeds ripen but, since the breakdown may occur at different rates in different seeds depending upon their specific circumstances, it spreads germination out over a period of weeks or months. In this way, a plant doesn't have all its "germination in one basket", i.e., all seeds germinate at once, only to be killed by drought, leaving the plant with no descendents. Examples of common native species in Utah with mechanical dormancy are lupines and milkvetches (*Astragalus* species).

In raising native species for our gardens we want the seeds to germinate quickly. There are a number of ways to overcome mechanical dormancy through a process called scarification. This can be accomplished by physical or chemical means. For large-seeded species like lupines, the thick seed coat can be nicked with

a razor blade to let water and oxygen in. Germination then follows quickly. Smaller seeds can be rubbed between two sheets of fine sandpaper to abrade away the thick or waterproof coating. In both cases, you should take care not to abrade too deeply and damage internal tissues.

Other methods of scarification use a hot water soak or abrade the seed coat in a solution of Hydrogen Peroxide or Sulfuric Acid. When using these methods you should consult references to find the right amount of time of soaking to break down the seed coat without damaging internal tissues.

The most low tech way to scarify is to put the seeds out in pots or in the garden in the fall and let natural mechanisms of wetting and drying, freezing and thawing or microbial attack break down of the seed coat.

The second type of dormancy is known as chemical dormancy where a chemical inhibitor within the seed prevents the development of the embryo even when water, oxygen, warmth, and light are present. Many of our native *Penstemons* and *Eriogonums*, for example, show this type of dormancy. To achieve germination the chemical inhibitor in the seed must be removed or broken down and then germination will occur.

Seeds of some native species, especially desert annuals, from habitats where drought is more of a risk to success than cold temperatures, contain a water soluble inhibitor. In nature, a significant rain-storm removes the chemical and germination proceeds. To remove this type of inhibitor you can simply soak the seeds in running water to encourage germination. But for seeds of many species from colder climates, the inhibitor is only broken down during the cold, moist conditions of winter. Then, the warm, moist conditions of spring lead to germination.

The technique to overcome this type of dormancy is called "stratification" and simulates natural winter conditions. This can be done in several ways. You can plant the seeds in containers and subject them to a cold, moist period in an unheated garage or porch. Studies have shown that the inhibitor breaks down most quickly at temperatures around 40 degrees F. Some species require only a few weeks of these conditions but others require up to three months or more. Often, once the inhibitor is broken down, germination occurs, even at low temperatures just above freezing. A space-saving technique to stratify lots of seeds is to put them in plastic baggies along with something to hold moisture. Long stranded peat moss is effective and its acidity retards the mold growth that can kill the seeds. I have also successfully placed seeds between two pieces of moist paper towel, previously microwaved to kill fungi (before the seeds are added) and then put them in the baggie. The temperature in a normal refrigerator drawer, not the freezer, is just about perfect for

for stratifying although my guests have often been surprised to open my refrigerator to see it full of bags of seeds rather than food. I usually put seeds to stratify in the refrigerator at the beginning of January and then plant them on a warm windowsill or in a greenhouse at the beginning of March to have them ready for outdoor transplanting in late spring.

There are far more complexities to seed germination than I have covered here but there are an increasing number of references where you can look up the "recipe" for the species you want to grow. Even for species you collect in the wild for which there is no published information, you can often guess what it will take by looking closely at the seeds. Is there a thick or shiny, waxy seed coat? Then try scarification. Small seeds often require light to germinate since they have few reserves in the seed and they must be planted shallowly. Stratification is often necessary for seeds from temperate climates and rarely hurts for most species.

Here are some websites where germination and other propagation tips can be found for many of our Utah natives. If the specific species you're interested in isn't listed, the recipe for another member of the same genus from a similar geographical area will often work:

Native Plant Network:

<http://www.nativeplantnetwork.org/network/search.asp>

USDA Plants Database:

<http://plants.usda.gov/java/factSheet>

USFS Woody Plant Seed Manual:

<http://www.nsl.fs.fed.us/wpsm/Genera.htm>

USDA Fire Effects Database:

<http://www.fs.fed.us/database/feis/plants/index>

Ontario Rock Garden Society:

<http://www.onrockgarden.com/> (Click on germination guide link)

Intermountain Native Plant Growers Association:

<http://www.utahschoice.org/FactsheetLinkpage.htm>

Alplains Nursery: A great commercial site for purchasing native seeds with germination recipes given for every species: www.alplains.com

A New Version of the Utah Rare Plant Guide

In 1991 a team of botanists led by Duane Atwood of UNPS created a beautifully illustrated guide known affectionately as the "Blue Book". Look up its full name on Google (*Utah Endangered, Threatened, and Sensitive Plant Field Guide*) and you get 150,000 references, attesting to its tremendous impact. It is heavily used by agencies responsible for managing public lands, and also by environmental consulting companies.

In 2003 Tony Frates produced a UNPS-hosted web version of the guide (www.utahrareplants.org), enabling much wider access and easier updating. Currently there are over 260 plants listed compared

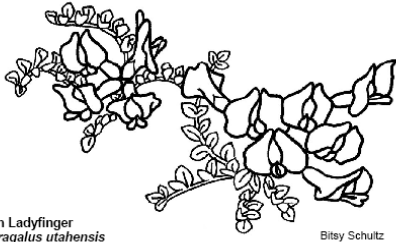


with the initial 181. Thirty of the originals are no longer listed – none have become extinct as far as we know, but priorities change, and we sometimes learn that a plant is not as rare as once thought.

Last year UNPS was invited to apply for a grant from the National Fish and Wildlife Foundation to produce a new version. In our application we proposed to obtain new botanical drawings for 35 species – such drawings highlight the minute details sometimes needed to distinguish between closely-related plants. We are also adding a new CD-rom version suitable for viewing on a laptop computer in the field: Internet is not available in most back-country campsites! This version, to be created by Bill Gray along the lines of his Cyberflora CD, will have many more photographs and maps than were available in the other formats.

Our application was successful, so over the next year and a half we shall be working hard to gather data, create drawings, and make a high quality finished product. You may be able to help in this. The original photographs, as published in the printed guide, were not digital and suffer badly when displayed on a computer screen. So we shall be trying to locate the originals and also to obtain new photographs. We would love to get everybody in UNPS involved by organizing field trips to various locations throughout the state. On the Rare Plant website there is a "wish list" page showing the most urgently wanted items, and this will be updated frequently. However, let us know if you have photographs of *any* of the species listed in the main guide – we have room for many more than could be fitted in the printed version. Contact Bill Gray (cyberflora@xmission.com) if you would like to help.

The principal people involved in this effort will be Duane Atwood (supervising the drawings to be made by April Jensen – see her wonderful illustration of Wasatch Fitweed above); Tony Frates (web-related activities and general manager of project); Bill Gray (digital photograph archive and CD-rom). – *Bill Gray, UNPS President*



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Astragalus utahensis

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Segolily

Newsletter of the Utah Native Plant Society

May 2007 Volume 30 Number 3



Kaiparowits milkvetch (*Astragalus malacoides*) can be recognized by its pinkish-purple pea-like flowers and slipper-shaped fruits. It is restricted to the Kaiparowits Plateau, Circle Cliffs, and Henry Mountains of southern Utah. Kaiparowits milkvetch is one of the signature plants of the Grand Staircase-Escalante National Monument, created by President Clinton under the Antiquities Act in 1996. Not well known as a biogeographer, Clinton nonetheless noted in his monument proclamation that "...the blending of warm and cold desert floras, along with the high number of endemic species, places this area in the heart of perhaps the richest floristic region in the Intermountain west." For more about the flora and vegetation of the Grand Staircase-Escalante National Monument, see the article beginning on page 6. Illustration by Kaye Thorne.

UNPS Spring Conference in Kanab and Grand Staircase area—May 18-20. See page 7 for details and to RSVP

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Utah Native Plant Society

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Mountain (Summit Co): Mindy Wheeler
Price (Carbon Co): Mike Hubbard
Salt Lake: Kipp Lee
Southern (Washington Co): Margaret Malm
Utah Valley (Utah Co): Celeste Kennard

Sego Lily Editor: Walter Fertig (walt@kanab.net). Articles, photos, and illustrations from members are welcome and encouraged. The deadline for the July 2007 Sego Lily is 15 June 2007.

Website: For late-breaking news, the UNPS store, the Sego Lily archives, Chapter events, links to other websites (including sources of native plants and the digital Utah Rare Plant Field Guide), and more, go to unps.org. **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

Chapter News

Cache: We contributed 200 dollars for the creation of a Native Plant Garden for CAPSA - Community Abuse Prevention Services Agency, a non-profit organization dedicated to helping victims of domestic violence and sexual assault. The garden will provide a place for relaxation and peace for clients. We will also provide labeling of plants and occasional volunteers for maintenance at the garden.

The Annual Spring Wildflower Walk is scheduled for May 15th, at 6PM, at the Green Canyon Parking Lot (approximately 1600 East and 1900 North in North Logan). Knowledgeable botanists will be there to show off our spring wildflowers and provide some stories about the native plants (and some non-indigenous ones) of Northern Utah. Contact springhike@saabra.org or call 435-752-2732 for more information.

Alternascapes 2007, sponsored by Master Gardeners of Cache Valley and the Utah Native Plant Society, will be held on June 23, from 4:00 to 8:00 PM. This is a self guided tour of Native Plant and Waterwise gardens in Cache Valley. At least five gardens are planned to be on the tour this year. Hosts and garden owners will be at each venue to answer questions, discuss waterwise gardening techniques, and to tell stories about their gardens. Tickets are available at the Cache County Extension Office (435-752-6263) in Logan (next to the historic courthouse—back entrance) or at the Cache Valley

Gardeners Market Information Booth - Saturdays starting May 12 at the corner of 200 East, and 100 South, Logan. Send inquiries to alternascapes@saabra.org or call 435-753-1130 (We could also use help with the tour). – *Steve Ripple*

Escalante (Garfield County): For the April monthly meeting, the Escalante Chapter hosted a talk by Kristin Legg, Bryce Canyon National Park's Chief of Resources and Research. Kristin spoke about the native plants that call Bryce Canyon home. Back in March the chapter substituted a work day out on Escalante's Main Street for a regular meeting. Almost 20 people volunteered their time to prune, deadhead, and remove trash from the planters and strips along Main Street. – *Allysia Angus*

Fremont (Richfield area): On March 15, the UNPS state board voted to accept the Fremont Chapter as the newest chapter of the society. At least 10 members have enrolled in the new chapter centered in Richfield. Rebecca Harms and Ron Parsons were elected as co-chairs, Jean Wood as secretary, and Janet Nielson as Treasurer. Thanks go to BLM botanist Maria Ulloa for helping get the chapter started.

Manzanita (Kane County): At our March meeting, Carolyn Shelton gave a lively presentation on writing and illustrating one's own personal nature journal. In April, Dorde Woodruff came to town and regaled the group with the story of her 40 year + research on an unusual light-flowered population of Small-flower fishhook

cactus (*Sclerocactus parviflorus*) from the Cottonwood Road area of Grand Staircase-Escalante National Monument. Saturday, April 28 will be our annual spring wildflower sale with Great Basin Natives and Wildland Nursery again on hand with their wares. The sale will be on the lawn of the Kane County Office of Tourism at 78 South, 100 East from 9 AM to noon.

Doug Reynolds will speak about conservation of landscapes vs. restoration at our special Friday, May 18 meeting that coincides with the UNPS spring board meeting and a weekend of field trips open to all UNPS members. See page 7 for full details – *Walter Fertig*

Salt Lake: Our April meeting featured Amber Richman of the USDA-APHIS-PPQ. She discussed how insect biocontrols are being used to fight several invasive plant species in Utah. These insects undergo years of testing and research before being released into certain areas of the state. The insects can often be host specific, such as the tamarisk beetle from Kazakhstan, and rid areas of their preferred food within one to several years.

On Saturday May 12th, the Salt Lake Chapter will be holding a native plant sale at REI on 3285 East 3300 South from 9am-4pm. Great Basin Natives will be bringing in native trees, shrubs, and perennials in various sizes. If you would like to volunteer for this event, please contact Kipp Lee at kipp_lee@comcast.net or Liz Schubert at liz@utahrox.com.

If you have a native plant garden that you would like to show off, we are in the process of arranging a Native Plant Garden Tour. If you are interested please contact Kipp or Liz.

Our monthly meetings have ended for the season. We will begin the first Wednesday of the month in September. – *Kipp Lee*

Utah Valley (Utah Co): Every Tuesday at 3:30 PM our chapter is working with students at Wasatch Elementary (1040N 900E, in Provo) on the Heritage Garden. Call Bitsy Schultz for more information 423-2603.

Every Thursday Morning at 10 AM our Plants and Preschoolers group has resumed. We go on short walks tailored to young children, but everyone is welcome. Come join us, as these walks have been very fun and full of exploration. We hike trails throughout Utah County. Call Celeste Kennard (801) 377-5918 or email her at celeste.p.kennard@gmail.com for details or to suggest a trail.

Saturday May 12th at 9 AM we will be going on a Field Trip to the Shoreline Trail. We will most likely be accessing the Trail from Rock Canyon unless the blooming of a species of flower calls us to another location. R.S.V.P. to Celeste Kennard (contact info above) for details. – *Celeste Kennard*

Utah Valley Chapter Field Trip: come see most of Utah's amazing cacti at one place, including the rare and endangered species. Jeff Mitchell has collected seeds and grown them all. He has done all the work

get permits to grow the protected ones. Time: May 12, 1 PM; cacti bloom in the full sun. Place: Jeff Mitchell's house: 1923 N 280 W, Orem, UT. Contact: Robert Fitts, 801-796-8631. – *Robert Fitts*

Upcoming Events

28 April 2007: TNC Field Trip to see Dwarf bearclaw poppy: Join The Nature Conservancy on a wildflower walk near St. George, Utah. Led by rare plant expert Dr. Renée Van Buren, we will see the dwarf bearclaw poppy, found in Washington County and nowhere else on Earth. Date: Saturday, April 28, 2007. Time: 8:00 a.m. to noon. Place: directions given upon RSVP. RSVP: (801) 531-0999 or to hndreberg@tnc.org by close of business on Tuesday, April 24. Event is free of charge. Since the trip is limited to 20 people, pre-registration is required.

Intermountain Herbarium Summer Workshops: The Intermountain Herbarium at Utah State University is pleased to announce the following workshops:

Introduction to Mushroom Identification This very popular yearly workshop introduces beginners to the wide, wonderful and fascinating world of macrofungi (mushrooms). Held over two days, the first evening is devoted to facts, fiction, and all things fungal, while day two is a day long adventure in the field finding and discussing the mushrooms of Logan Canyon. When: Friday May 18 (6:30 pm) and Saturday May 19 (9:00 am). Where: Intermountain Herbarium on the campus of Utah State University. Cost: \$30 for UNPS members (\$35 otherwise). Registration ends May 11, and the limited space fills up very quickly! Instructor: Michael Piep, Assistant Curator of the herbarium and Bridgerland Mushroom Society President.

Willow Identification Join the herbarium and Al Winward (USDA Forest Service – retired) on a day long adventure learning to identify native willows (*Salix* sp.) in beautiful Logan Canyon. A key will be provided, but field characteristics will be emphasized. When: Saturday June 9. Where: Intermountain Herbarium on the campus of Utah State University. Cost: \$20. For more information contact the Intermountain Herbarium or see <http://herbarium.usu.edu/>.

Spurge Purge a Success

The myrtle spurge weed exchange at REI went fabulously on April 14. The weather was perfect and lots of people had heard about the event through the diligent efforts of many organizers (even notices to individual homeowners in some East Bench neighborhoods). We had 177 participants who collectively brought in well over a ton of spurge (and a few Dalmatian toadflax, Dyer's Woad, and even some creeping Jenny!). The native plants we handed out in exchange for the spurge were excellent, thanks to Janett Warner and her fellow growers, and the information packets we were giving out to participants were super and will continue to educate and inform. All the organizers deserve a round of applause! – *Therese Meyer*

Conservation Groups Respond to USFWS Reversal on Listing Graham's Penstemon

In January 2006, the US Fish and Wildlife Service (USFWS) proposed to add Graham's penstemon to the endangered species list. Instead of finalizing protections, in December 2006 the Service suddenly reversed course and claimed that threats were no longer present. In response, citizens in Utah and Colorado have warned the Secretary of Interior and the Director of the Service that a lawsuit will follow unless USFWS protects this rare wildflower in the next two months.

"The claim that new scientific information underpins the decision to withdraw listing of Graham's penstemon as Threatened is inaccurate," stated Dr. Vincent Tepedino. "No such evidence exists." Dr. Tepedino, a recently retired Utah State University professor, attempted to investigate the penstemon's pollination biology, but found almost no flowering plants and no seed production during 2004 and 2005. He is a coauthor to the Lewinsohn et al. (2005) report cited in the Service's December rule.

This reversal was similar to many others made by the Service in recent years. On March 23rd, the Inspector General for the Department of Interior issued a report detailing chronic interference in Endangered Species decision making by political appointee Julie MacDonald. The report stated, "we confirmed that MacDonald has been heavily involved with editing, commenting on, and reshaping the Endangered Species Program's scientific reports from the field. MacDonald admitted that her degree is in civil engineering and that she has no formal educational background in natural sciences, such as biology". House Natural Resources Committee Chair Nick Rahall (D-WV) has pledged to hold hearings investigating political interference and suppression of science in Endangered Species decisions made by the Service. The Endangered Species Act specifically requires that endangered species listing decisions be based solely on the best available science.

"The scientific integrity of the country's Endangered Species program is at stake now," said Erin Robertson, Senior Staff Biologist for Center for Native Ecosystems. "Secretary Kempthorne must ensure that threatened wildflowers like Graham's penstemon have a real shot at avoiding extinction."

Graham's penstemon, a member of the snapdragon family with brilliant lavender-pink flowers, only inhabits oil shale outcrops in the Uinta Basin of northeastern Utah and adjacent Colorado. The penstemon was first considered for Endangered Species Act protection in 1975, when the Smithsonian drafted the first list of plants to be protected under the Act. After nearly 30 years without action, and with threats mounting, conservation groups



Above: Graham's penstemon photo by Susan Meyer from Center for Native Ecosystems website.

formally petitioned the Service to protect the penstemon in 2002.

"This is one of the rarest and most threatened plant species in Utah," said Tony Frates with the Utah Native Plant Society. "The failure to list this species in 2006 was a result of politics rather than science."

The Service admitted in the December reversal that 88% of the penstemon's populations are in areas where active oil and gas exploration is already taking place. It also acknowledged that all three of the formal scientific reviewers of the Service's January 2006 proposal to protect the penstemon "felt that our proposed rule justified listing" (71 Fed. Reg. 76026 (Dec. 19, 2006)).

The January 2006 listing proposal cited the following threats: "Habitat destruction and degradation as a consequence of energy development throughout the species' range pose a serious threat to long-term viability. Habitat loss and fragmentation also will exacerbate threats arising from very low natural population numbers and restricted distribution; natural phenomena such as drought and wildlife grazing; livestock grazing; and horticultural collection" (71 Fed. Reg. 3164 (Jan. 19, 2006)).

"Graham's penstemon is very rare in Colorado," said Dave Anderson with the Colorado Native Plant Society, "and it is threatened by oil and gas drilling. We believe it deserves a fair chance, and that its merits as an Endangered Species should be reevaluated."

The Endangered Species Act requires that citizens provide notice to the government 60 days before they intend to sue regarding violations of the Act. The Notice of Intent to Sue was filed on April 5, 2007 by Center for Native Ecosystems, Utah Native Plant Society, Colorado Native Plant Society, and Southern Utah Wilderness Alliance. The Interior Department could avoid a lawsuit by reinstating the proposal to protect the penstemon and moving forward with finalizing the protections.

- Erin Robertson

New and Improved Utah Plant Atlas Now On-Line

In the early 1980s Beverly Albee, Leila Shultz, Sheryl Goodrich, and colleagues undertook an effort to map the distribution of most of the vascular plant species of Utah. Seven years and 400,000 herbarium specimens later, *Atlas of the Vascular Plants of Utah* was published as a hardcover book by the Utah Museum of Natural History in 1988. This landmark publication contained distribution maps of 2438 plant species depicted on a base map of shaded topographic relief and county boundaries. Long out of print, a digital version of the atlas has been hosted by Utah State University for more than a decade.

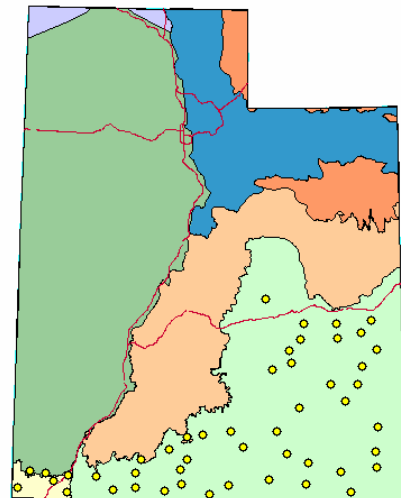
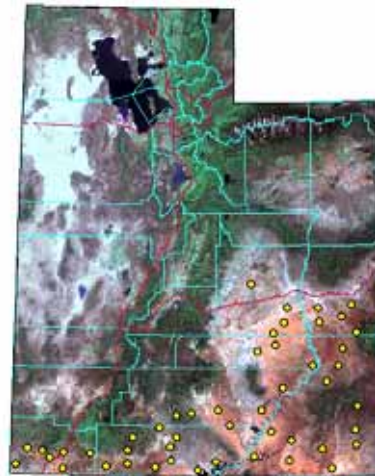
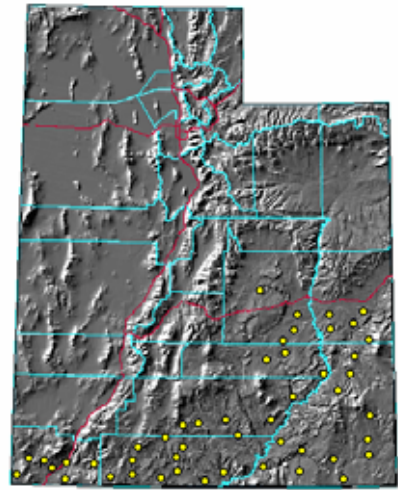
Unfortunately, the original atlas from the 1980s has become dated as new distribution records and new species have accumulated over the past 20 years. Several years ago, Leila Shultz, Douglas Ramsey, and Wanda Lindquist of Utah State University recognized the need to overhaul the static printed version of the atlas with an interactive, web-based version that could be more readily updated and take advantage of advances in GIS technology. The result of their efforts is now available with the release of the *Digital Atlas of the Vascular Plants of Utah* (<http://earth.gis.usu.edu/plants/index.html>).

The revised atlas includes 419 new species that were not depicted in the original version (these are mostly rare species or taxa discovered or described in Utah since 1988). Nearly 500 taxonomic name changes have been made (relevant synonyms are used in the master checklist to aid those unfamiliar with many of the changes). In addition, over 8400 new locations have been added from herbarium specimens collected since 1988 and from the archives of the Utah Conservation Data Center.

But the best part of the revised atlas is the many new bells and whistles. Instead of just a base map of shaded relief, the atlas user can now substitute other layers, such as a satellite mosaic, TNC ecoregions, or a plain background of county lines (see examples at right for *Dimorphocarpa* [*Dithyrea*] *wislizeni*). Each location point on the map is now linked to a live database that provides additional information on the source of the record and often its Township and Range. The authors have also provided an annotated checklist of Utah species by each of the state's seven ecoregions (as defined by The Nature Conservancy).

The digital atlas will be kept revised as new location records become available, so unlike a printed book, it will always stay up-to-date. The atlas should remain a valuable reference for anyone interested in the distribution of Utah's flora for many years to come. – *Walter Fertig*

*Below: Shaded relief (top), satellite mosaic (middle), and TNC ecoregion (bottom) maps depicting the distribution of Spectacle-pod (*Dimorphocarpa wislizeni*) in Utah from the new Digital Atlas of the Vascular Plants of Utah.*



Flora and Vegetation of Grand Staircase-Escalante National Monument

By Walter Fertig

Grand Staircase-Escalante National Monument (GSENM) was established in September 1996 when President William J. Clinton invoked the Antiquities Act to protect nearly 2 million acres of remote canyons and slickrock mesas in Kane and Garfield counties, Utah. In addition to spectacular scenery, the new monument contained a rich trove of geological, archaeological, paleontological, biological, and historic wonders that were to be managed as an outdoor laboratory to further scientific research. The lands comprising the monument were primarily administered by the federal Bureau of Land Management (BLM) and Utah state trust lands (swapped to BLM in 1999). In an unusual precedent, Secretary of Interior Bruce Babbitt kept the new monument under the jurisdiction of BLM rather than turning it over to the National Park Service. GSENM became the flagship of the BLM's new National Landscape Conservation System, an effort by the bureau to modify its historic role from promoting mining, livestock, and extractive industries on the "lands no one wanted" to being more conservation-minded stewards of important scientific and recreational areas.

In the proclamation creating the monument, President Clinton devoted an entire paragraph to extolling the botanical and ecological values of the region. Indeed, GSENM has the highest plant species richness of any protected area in Utah (exceeding even Zion National Park) and is second only to Grand Canyon National Park in the Colorado Plateau ecoregion. Much of the species diversity of the monument can be attributed to its location near the boundary of three major centers of plant speciation: Colorado Plateau, Mohave Desert, and Utah High Plateaus. In addition, GSENM's size and elevational breadth capture a wide array of vegetation types, ranging from desert shrublands to montane coniferous forests and riparian woodlands.

Floristic Diversity

At a scientific conference celebrating the first anniversary of the monument in 1997, Leila Shultz of Utah State University predicted that on-going floristic and ecological research would ultimately bring the GSENM flora to about 1100 taxa. Since then, 233 new vascular plant species have been discovered within the monument, bringing the current flora to 1002 taxa. An additional 100-200 species are known from the vicinity of the monument in Kane and Garfield counties, and may still be found in GSENM.



Above: *Stella's evening-primrose* (*Oenothera caespitosa* var. *stellae*) and *Kodachrome bladderpod* (*Physaria* [*Lesquerella*] *tumulosa*), two Utah endemics from the Paria River Member of the Carmel Formation, south of Cannonville on GSENM. Stan Welsh named the new variety of evening-primrose after his wife, Stella in 2003. Photo by W. Fertig.

The vast majority of species documented in GSENM were collected by Stan Welsh, Duane Atwood, and colleagues from Brigham Young University during floristic surveys for the proposed Kaiparowits power plant in the early 1970s and again from 1992-93 and 1997-2002*. Over the years, however, the monument area has attracted many other botanical luminaries, including Marcus E. Jones, Ellen Powell Thompson, Alice Eastwood, John T. Howell, Basset Maguire, Walter Cottam, B.F. Harrison, Dwight Ripley, Rupert Barneby, Noel Holmgren, James Reveal, and Arthur Cronquist, who all added significant collections, including nearly three dozen type specimens from GSENM and vicinity. Since 2001, Welsh and Atwood have described at least five new taxa that were first recognized during their surveys of the monument (Lori's columbine, Stella's evening-primrose, Murdock's evening-primrose, White chia, and Smoky Mountain globemallow).

GSENM contains about 26% of the entire flora of Utah and 46% of the flora of the Colorado Plateau section of the state. Nearly 75% of the monument's 1002 species belong to just 16 plant families, led by the sunflower family (Asteraceae, 179 taxa), grass family (Poaceae, 119 taxa), pea family (Fabaceae, 82 taxa), and mustard family (Brassicaceae, 57 taxa).

* Since the BYU study ended in 2002, 43 additional plant taxa have been added to the monument flora by Laura and Walter Fertig, Peter Lesica, Elaine Kneller, Max Licher, Anne Walka, Sean Stewart, and others. The two latest additions (Ripgut brome and Canada bluegrass) came in June 2006 during a field trip to Calf Creek Falls by the Manzanita and Escalante chapters of UNPS.

Although often ecologically dominant, trees and shrubs account for only 14% of the monument's plant species. Herbaceous species (a.k.a. 'wildflowers') are the dominant growth form with 695 species. Just over 200 species of wildflowers are annuals that complete their entire life cycle in one year and are often only prevalent during years of sufficient winter or spring precipitation. About 15% of the monument flora is comprised of perennial and annual grasses and grass-like plants (sedges and rushes).

Biogeography

GSENM resides entirely within the Colorado Plateau physiographic province, a broad regional uplift centered on the Four Corners region of Utah, Colorado, New Mexico, and Arizona. The Colorado Plateau has a unique flora adapted to the region's arid continental climate, canyon and mesa topography, and layer-cake geology of Mesozoic and early Tertiary marine, lacustrine, or ancient coastal sandstones, limestones, and shales. Due to the variety of habitats and isolation provided by wide rivers and deep canyons, the Colorado Plateau is regarded as one of 12 major centers for the evolution of new plant species in western North America. The plateau region has the highest concentration of endemic plant species in the intermountain west and the highest species richness of any ecoregion in Utah. Approximately 18% of the flora of the monument (178 species) consists of plant species that are restricted to the Colorado Plateau.

The lower stairs of the Grand Staircase near Kanab (Chocolate and Vermilion cliffs) have been described as the "Dixie Corridor" connecting the floras of the Colorado Plateau and the Mohave Desert of southwestern Utah and southern Nevada. The Dixie Corridor lies at the northern edge of the distribution of many Mohave or Sonoran desert species, including Whipple's cholla, Mexican manzanita, and Turbinella live oak. In addition, the Dixie Corridor has an unusually high concentration of local endemics restricted to Navajo sand dunes (Welsh's milkweed, Escarpment milkvetch), Moenkopi clay flats (Kane breadroot, Meager camissonia, Atwood's pretty phacelia), and Chinle badlands (Gumbo milkvetch, Murdock's evening-primrose, Kanab thelypody). Many of these local endemics are listed as Threatened, Endangered, or BLM Sensitive and are rare or absent from other portions of the monument.

At higher elevations of the Skutumpah Plateau, White Cliffs, and slopes of Canaan and Boulder mountains, the Colorado Plateau flora is augmented by Rocky Mountain species more typical of the Utah High Plateaus ecoregion. This mountainous spine also acts as an effective barrier to the desert flora of the Great Basin region. Over 40 plant species are endemic to the Utah High Plateaus,

Explore Grand Staircase-Escalante National Monument during 2007 UNPS Spring Conference in Kanab

The Manzanita (Kane County) Chapter will be hosting the UNPS state board meeting and a general membership event over the weekend of May 18-20. Things will kick off with our monthly chapter meeting at 7 PM on a special night (Friday, May 18) in the public meeting room of the Grand Staircase-Escalante NM visitor center (between Walker's truck stop and Holiday Inn on US Hwy 89 east of downtown Kanab). Our speaker will be Doug Reynolds, retired ecology professor from the Greater Cedar City area who will discuss some of the pitfalls of restoration work and why it is better to conserve lands rather than try to re-create them afterwards. This meeting is free and open to the public and will be followed by a potluck dessert social. On Saturday morning, Walter Fertig of the Kane County chapter will lead a field trip to explore several interesting plant communities along Hwy 89 on GSENM. The trip will leave from the GSENM visitor center parking lot at 8 AM and will return at ca 2 PM. The UNPS Board meeting will be held on Saturday afternoon at the Village cafeteria at Best Friends Animal Sanctuary from 3-5 PM. This will be followed by a potluck social at 6:30 PM hosted by the Kane County Chapter at a private residence at Best Friends. Open to all members and guests. On Sunday, the Kane County chapter will sponsor a morning field trip to Lick Wash off the Skutumpah Road to see many of GSENM's Zion disjuncts. This trip will leave from the monument visitor center parking lot at 8 AM and will conclude by 1 PM. **Those participating in the field trips and potluck are asked to RSVP at walt@kanab.net.** – *Walter Fertig.*

many of which have recently been documented for the Grand Staircase region. These include MacDougal's aletes, Zion draba, Panguitch buckwheat, Canaan daisy, Zion daisy, Paria breadroot, and Smooth penstemon.

The number of species in the monument flora has increased by nearly 10% with the establishment of 96 non-native species. The majority of these taxa were introduced inadvertently, but a small percentage have escaped from agriculture (Smooth brome, Orchard grass), restoration projects (Prostrate summer-cypress, Burnet), or home gardens (Peppermint). Six GSENM non-native species are listed as Utah state noxious weeds (Whitetop, Russian knapweed, Bindweed, Quackgrass, Scotch thistle, and Johnson grass).

Vegetation

The vegetation of GSENM can be subdivided into five major zones that roughly correspond with elevation, parent material, and precipitation or proximity to perennial water sources. Low elevation upland sites on fine-textured clay or sandy soils with annual precipitation less than 7 inches are vegetated by dry desert shrub and grasslands dominated by members of the goosefoot family (Chenopodiaceae). Desert shrub stands are especially well-developed along the lower slopes and mesas of the Kaiparowits Plateau. Shadscale tends to be the most prevalent species in shrub stands on well-drained alkaline clay sites, while Mat saltbush predominates on clay barrens of the Tropic Shale near the Paria River. Sandy or stony loams with a shallow subterranean hardpan (formed of leached calcium carbonate hardened into a stony layer impervious to water) support stands of Blackbrush (a member of the rose family). Fourwing saltbush mixed with Green mormontea, Sand sagebrush, Purple sage, and Indian ricegrass replace other vegetation on deep sandy soils. Finally, Greasewood dominates in poorly drained alkaline clay soils with a high water table. Unfortunately all of these community types are becoming infested with aggressive, annual exotics (especially Red brome, Cheatgrass, Halogeton, and Mediterranean barley) which make the stands more prone to fire (formerly a rare event). Livestock grazing has also reduced the cover of edible shrubs and native perennial grasses in favor of less palatable subshrubs (especially Broom snakeweed) and warm season grasses (Blue grama and Galleta) and more annual exotics.

Vegetation dominated by Big sagebrush or other sagebrush species replaces desert shrub at higher elevation sites with annual precipitation over 7 inches. Sagebrush stands are characterized by a sparse to dense shrub canopy of *Artemisia* interspersed with other shrubs, biological soil crusts, perennial or annual grasses, and forbs. Basin big sagebrush is the typical form along washes and valley bottoms and in sites with rich, sandy-loam soils. Wyoming big sagebrush is also frequent, especially in clay-rich or gravelly sites and Mountain big sage occurs sparsely at higher elevations on the Skutumpah Terrace. Historically the grass understory of sagebrush communities consisted of a mix of cool season (Needle-and-thread, Indian ricegrass, Muttongrass) and warm season (Blue grama, Galleta) perennial bunchgrasses, but grazing and droughty climates have shifted the balance to less palatable warm season species as well as annual weeds and unpalatable subshrubs like Broom snakeweed. Because sagebrush does not resprout or accumulate a long-lived seedbank, fire can eliminate or reduce sagebrush stands in favor of perennial or exotic annual grasslands.



Above: *Golden mariposa* (*Calochortus aureus*) from GSENM by W. Fertig.

Rocky sandstone slopes and tablelands tend to be dominated by pygmy woodlands of Two-needle pinyon and Utah juniper. Pinyon-juniper woods cover over 770,000 acres of GSENM, making it the monument's most widespread vegetation type. Based on historic records, pinyon-juniper woodlands appear to be expanding over the past century. This "invasion" can be attributed to reduced fire frequencies due to removal of fine fuels by grazing, cessation of Indian-caused wildfires, warming climates, and recovery of woodlands from extensive cutting for fuel and building material following white settlement in the 1880s. Historically, these woodlands probably had a more open appearance but have become denser and woodier from prolonged fire exclusion, making the woods more prone to major fire. Pygmy forests are often replaced by Gambel oak woodlands on sandy benches with high fire frequencies (oaks will readily resprout) or on slopes with deep snow accumulation or frequent landslides.

Forests of Ponderosa pine and Douglas-fir prevail on the highest mesa tops or in deep, shady canyons of the monument. In the past, Ponderosa pine forests typically had an open, savanna-like understory dominated by Greenleaf manzanita and bunchgrasses adapted to acidic soils produced from the abundant needle duff. These open conditions were maintained by periodic, low-intensity ground fires that eliminated other trees and woody vegetation but did not harm the mature, thick-barked pines. Fire suppression has made these stands denser and more susceptible to outbreaks of Mountain pine beetles or catastrophic crown fires. Mountain brush communities of Utah serviceberry, Mountain snowberry, and Chokecherry often replace pine forests on moister slopes, while brushy stands of Alder-leaf mountain mahogany, Cliffrose, and Greenleaf manzanita prevail on rockier or less fertile sites. Moist sites with deep, loamy soils associated with springs or with a



Illustration by E S Kneller

Above: *Lori's columbine* (*Aquilegia loriae*) was described as new to science in 2001 by Stan Welsh and Duane Atwood based on a collection from Lick Wash on GSENM. The latin name commemorates Lori Armstrong, former BLM botanist from Richfield, Utah. Illustration by Elaine Kneller McMullen.

high water table support Aspen forests in scattered sites on Fiftymile Mountain. Aspen is a clonal species with individual tree boles surviving for 100-150 years and new sprouts forming from root suckers. Regeneration can be hampered by heavy grazing by deer, elk, or livestock or by competition from shade-tolerant conifers if periodic disturbances (such as fire, wind-throw, or disease) do not create the open-canopy conditions favored by aspen sprouts.

The most species-rich plant communities are associated with rivers, streams, springs, or ephemeral wetlands. The main stem of the Escalante River and its more northerly tributaries are characterized by deep, shady canyons and perennial flows that support riparian woodlands and shrublands dominated by Fremont cottonwood, Narrowleaf cottonwood, Coyote willow, Box-elder, and Water birch with a rich understory of herbaceous species. Flooding events frequently reshape the stream channels, scour existing sand and gravel bars, and deposit new sediments. These disturbances can leave the river systems vulnerable to invasion by non-native species, especially Tamarisk and Russian olive. Streams in the Kaiparowits Plateau and Paria, Kanab Creek, and lower Escalante drainages have been especially hard-hit by tamarisk and Russian olive. De-watering and changes in grazing management have also

favored replacement of native willows and cottonwoods with less palatable shrubs and herbaceous plants, such as Copperweed, Rubber rabbitbrush, and Baltic rush.

Desert springs and seeps occur sporadically across the monument, especially along contacts between porous sandstones and less permeable shales. Large springs are often mini-oases of Fremont cottonwood and Coyote willow, while smaller seeps on alkaline soils are often dominated by Baltic rush, Scratchgrass, Threesquare bulrush, or Desert saltgrass. Protected seeps associated with shady alcoves or cliffs that maintain cool temperatures support especially lush hanging garden vegetation of Maidenhair fern, Helleborine orchid, Alcove columbine, panicgrass, Golden sedge, and nearly 40 other species.

One of the more unusual wetland communities of the monument are sand seeps associated with sandy swales carved from sandstone bedrock. Sand springs originate from melted snow or precipitation of the current season, rather than from perennial water sources, and so are present only in wet years, such as 2005. When present, the sand springs support communities dominated by uncommon annual or biennial forbs and graminoids, including Hairy mimetanth, Cottonbatting cudweed, Religious daisy, and Minute rush. On GSENM, sand seeps are most prevalent in deep Navajo blowsands topping the Vermilion Cliffs east of Johnson Canyon, but also occur frequently in the Sand Hills near Coral Pink Sand Dunes just west of the monument.

The flora and vegetation of GSENM contribute significantly to the region's natural beauty and its importance as habitat for wildlife and humans seeking recreation, adventure, or solitude. More importantly, the monument's native plant species have intrinsic value, especially those restricted to GSENM or unprotected elsewhere. These botanical riches were specifically protected in the Presidential proclamation of 1996 and GSENM's 2000 management plan. But protections are only as strong as their enforcement. Budget cuts, political pressure, and shifts in BLM priorities have since undermined GSENM's stated management objectives. It is up to everyone who cares about these lands and their botanical denizens to make sure that the promise of the monument proclamation to future generations is kept.

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Utah's noxious weed law reflects "Old West" attitude

Does "all or nuthin'" really work?

By Maggie Wolf,
UNPS Horticulture Committee Chair

Just like the scene of an old cowboy movie, when the grizzled bad guy points his six shooter at our conscientious hero and drawls "Yer either fer us, or ageen' us," Utah's Noxious Weed law oversimplifies a difficult choice. Once declared "noxious" at state or county level, weeds in public and private land must be controlled by county weed supervisors who often face funding limits. The decision to declare a weed noxious is up to the county's legislative body. Legislators may or may not know how damaging weeds can be. They usually realize that weed control costs taxpayer money and that weed control enforcement often causes political backfire - two things legislators tend to avoid.

"Weed control has traditionally been an agricultural concern," explains Ralph Whitesides, Weed Specialist at Utah State University Extension and a key member of the Utah Weed Control Association's Strategic Plan Steering Committee. This committee met in February 2004 and meets again April 18, 2007.

"Our strategic plan is intended to broaden cooperation and partnerships among agriculture, BLM, Parks, and other agencies," Whitesides explains. Because weeds spread across political boundaries, cooperation among many agencies is critical to success. Still, current law relies on county governments to decide whether or not to take action against weeds that threaten local areas.

"Our [2004] plan also said we would review the Utah Noxious Weed Law," Whitesides notes. "I would really like to see a more tiered approach in our law. That might allow emergency actions funded at the state level to control weeds immediately, rather than waiting until the problem is so widespread we can't do anything about it." County agencies are often under-funded, so when a "new" weed is noticed, it may take more than a year to fund control efforts. Even then, if an adjacent county allows the weed to continue spreading, efforts may be wasted.

Whitesides cites the example of purple loosestrife, an escaped ornamental plant that grows best in wet areas. "It took a long time to get purple loosestrife on the [Utah Noxious Weed] list. Maybe if immediate action had been taken, it wouldn't be as widespread as it is now," he says.

Other states, like Colorado, categorize weed threats at different levels. Weeds may be on "List A"; these weeds must be eradicated wherever



Above: Scotch thistle (*Onopordum acanthium*) from Connecticut Botanical Society

detected statewide. "List B" weeds must be eradicated, contained, or suppressed in parts of the state where designated by the commissioner. Weeds on "List C" are widespread and well-established; their control is recommended but not required throughout the state. Local governing agencies may, however, require control of List C weeds within their areas.

In Salt Lake County, increasing concern over *Euphorbia myrsinites* has illuminated the limitations of Utah's noxious weed law. Shall our county legislators dedicate tax money for immediate action? Create an unfunded mandate? Or ignore the matter completely? If our law allowed for more incremental weed controls, such simple decisions might become much less difficult.

Utah's Noxious Weed List 18 species are officially designated as noxious for the state of Utah

Bermuda grass (*Cynodon dactylon*)*
Canada thistle (*Cirsium arvense*)
Diffuse knapweed (*Centaurea diffusa*)
Dyer's woad (*Isatis tinctoria*)
Field bindweed (*Convolvulus arvensis*)
Whitetop or Hoary cress (*Cardaria draba*)
Johnson grass (*Sorghum halepense*)
Leafy spurge (*Euphorbia esula*)
Medusahead (*Taeniatherum caput-medusae*)
Musk thistle (*Carduus nutans*)
Perennial pepperweed (*Lepidium latifolium*)
Purple loosestrife (*Lythrum salicaria*)
Quackgrass (*Elymus repens*)
Russian knapweed (*Centaurea repens*)
Scotch thistle (*Onopordum acanthium*)
Spotted knapweed (*Centaurea maculosa*)
Squarrose knapweed (*Centaurea squarrosa*)
Yellow star-thistle (*Centaurea solstitialis*)

* Except for Washington County.

Utah Plant Families: The Dogwood Family (Cornaceae) By Walter Fertig

With a name like “dogwood” it is only natural to assume that members of the Cornaceae either bear some resemblance, or are undeniably attractive to our canine companions. In truth, the word dogwood is a corruption of a Scandinavian term “dag”, meaning skewer. The hard woody stems of dogwood are excellent for roasting game over a fire or use in basketry or wicker. Indeed, the Latin name for the dogwoods, *Cornus*, translates as “horn” in reference to the hardness of the plant’s wood, which has often been used as a substitute for metal in the manufacture of weaving shuttles, bobbins, and farming implements.

The dogwoods are a relatively small family, with about 100 species distributed widely across the northern hemisphere, extending into the mountains of South America and rarely into the tropics. About half of all known species in the family belong to the genus *Cornus*, although taxonomic splitters have suggested dividing this group into as many as eight separate genera.

Utah is home to only one native dogwood, the Red-osier (*Cornus sericea* or *Swida sericea*). Red-osier dogwood gets its common name from the bright red stems (osier is French for long, willow-like shoot) that are especially obvious when the leaves have shed in winter. In this condition the shrub’s bark can resemble that of willows with which it shares an affinity for wet soils and damp stream-sides. In summer, Red-osier dogwood is easily recognized by its oval to elliptic leaves with prominent veins that gently curve to follow the smooth margins of the blade. Dogwoods are among the few tree or shrub species in the west with opposite leaves (occurring in pairs on opposing sides of a stem, rather than singly in a zig-zag fashion) that are neither lobed nor divided.

The most reliable way to identify a dogwood in leaf is to break the leaf stalk or petiole and slowly pull each half apart to reveal the stringy white pith inside. The pith is part of the network of fibers that give the stem rigidity and flexibility. Dogwood pith is unusual in its elasticity, allowing it to be pulled like cotton candy batter, though it is less edible and less brightly colored.

Like most dogwoods, Red-osier has inconspicuous white flowers with four or occasionally five petals borne in a flat-topped umbrella-like cyme. Flowering dogwood (*Cornus florida*) and Kousa (*C. kousa*) differ in having four large, petal-like, bracts enfolding the inflorescence to create the illusion of a single enormous flower. Neither of these species is native to Utah, though both are occasionally grown as ornamentals, especially in northern counties. Bunch-



Above: Bunchberry (*Cornus canadensis*) is an attractive, herbaceous member of the Cornaceae clan with the characteristic petal-like floral bracts of many, though not all, dogwood species. Bunchberry is not native to Utah, but does occur widely across northern Canada, Alaska, the northern Rockies, and the eastern US. Photo by W. Fertig from near Juneau, Alaska.

berry (*Cornus canadensis*) has similar flowers but is a low-growing herb instead of a tree or shrub. Additional anatomical differences have prompted some taxonomists to segregate the herbaceous dogwoods into the genus *Chamaepericlymenum*. Unfortunately for those who enjoy the challenge of tongue-twisting Latin names, this group is not found in Utah (though they occur sporadically in the Rockies and across boreal Alaska and Canada).

Dogwoods produce showy red or white fleshy fruits that are often as attractive as the flowers. Technically, the fruits are drupes (like cherries) with a single, hard seed inside. Dogwood fruits are an important food source for songbirds and grouse.

Red-osier was one of several plants referred to as “kinnikinnik” (meaning “that which is mixed” in Algonquian) for its use by American Indians as a tobacco substitute. The inner bark of young stems was split and scraped into threads and toasted over a fire before being mixed with real tobacco. Though he never admitted to trying it, edible plant aficionado H.D. Harrington noted that Red-osier “is said to be aromatic and pungent, giving a narcotic effect approaching stupefaction”. He recommended its use only in moderation.

Perhaps it is fortunate that we have adopted the term “dogwood” over the more linguistically pure “dagwood” for these handsome and useful shrubs. Certainly, the image of a buffoonish cartoon character noted for sleeping on the job and crashing into the postman does not befit the dogwood clan. More importantly, the word dogwood allows for the clever botanical joke, always worth repeating: How do you tell a dogwood? By its bark, of course!



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Sego Lily

Newsletter of the Utah Native Plant Society

July 2007 Volume 30 Number 4

Cedar Breaks Wildflower Festival 30 June-22 July 2007

The second annual Cedar Breaks Wildflower Festival runs this year from June 30th through July 22nd. Events include one hour guided wildflower walks twice each day as well as longer, specialized workshops on topics ranging from plant communities, wildflower photography, nature journaling, and Junior Ranger programs for children. A complete schedule of events can be found at the Zion Natural History Association website (www.zionpark.org) or the Cedar Breaks National Monument website (www.nps.gov/cebr).

This year the Monument sponsored its first contest for artists and photographers to submit their work for the festival poster (grand prize was \$100). Artists and photographers should visit Cedar Breaks this year to find inspiration for next year's competition. – *Doug N. Reynolds*

Cover Photo: *Townsendia leptotes* is one of the earliest wildflowers to begin flowering at Cedar Breaks NM. Photo by Doug N. Reynolds. For more on Cedar Breaks, see the article on pages 4-5.



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Sego Lily Editor: Walter Fertig (walt@kanab.net). News items, articles, photos, and illustrations from members are always welcome and encouraged. The deadline for the September 2007 Sego Lily is 15 August 2007.

Website: For late-breaking news, the UNPS store, the Sego Lily archives, Chapter events, links to other websites (including sources of native plants and the digital Utah Rare Plant Field Guide), and more, go to unps.org. **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

Chapter News

Escalante (Garfield County): The Escalante Chapter hosted a work meeting in May where we discussed compiling a local water-wise and native plant resource guide for the public (especially residents new to the area) who desire to use native plants and water-efficient techniques in their home landscapes. Members shared their ideas, lessons-learned, and suggestions of how to best approach the project.

Several members are staying busy helping to maintain the Escalante Main Street landscaping which features mostly native and drought-tolerant plantings from one end of town to the other.

The June meeting is the annual chapter potluck BBQ which was held on June 12 at the City Park.

The chapter will take a break for the month of July with no meeting scheduled and then meet every other month beginning in August.

Fremont (Richfield area): We had a booth at the natural resources fair. It was a big hit. We gave coloring books and wildflower posters provided by BLM.

We will have a campout on July 6-7 at Mt. Terrell Ranger Station on the Fishlake NF. We have volunteered to identify wildflower seed collecting sites to harvest seeds in the fall. This seed will be planted along the Gooseberry Road (currently being upgraded). We have been asked by Fremont Indian

State Park for advice on what natives to plant in area that they are restoring. – *Maria Ulloa*

Manzanita (Kane County): The Kanab chapter is offering two summer activities:

Saturday, June 30: Botanizing Cedar Breaks - In conjunction with the 2nd annual Cedar Breaks NM Wildflower Festival, we will be exploring some interesting botanical areas of Cedar Mountain. Our itinerary will include some hiking along the rim of Cedar Breaks Amphitheatre (with great views of the Claron limestone) searching for showy wildflowers and cushion plants, followed by a short excursion along the Rattlesnake/Ashdown trail through aspen and spruce forests, and if time and weather permit, exploring around Brian Head. Plan to meet at the Cedar Breaks NM visitor center parking area at 10 AM (the drive to Cedar Breaks from Kanab takes about 80 minutes depending on traffic).

Saturday, August 18: Flora and Fire Ecology of the Kaibab Forest - Last June's Warm Fire scorched a large swath of the Kaibab National Forest on the north rim of the Grand Canyon and touched off local controversy over the role of fire in forest management. We will explore some areas that were lightly burned and others where the fire raged very hot to see how the vegetation has responded in one years time. Plan to meet at the parking lot of the Grand Staircase-Escalante NM visitor center (next to Walkers) at 8:30 AM to carpool or caravan to Jacob Lake and beyond. – *Walter Fertig*

President's Corner- Highlights from the Spring Meeting in Kanab

The Manzanita (Kane County) chapter hosted a meeting from May 18th to May 20th, which was a real treat for several of us who made the journey from around the state, plus Dick Hildreth who made it all the way from Tucson. Friday evening was given over to a talk by Doug Reynolds, who gave a very sobering account of how incredibly difficult it is to make meaningful restoration on land that has been badly damaged by overgrazing or invasive weeds. We hope that Doug will write an article for *Sego Lily* so that everyone can share his insights.

Saturday morning Walt Fertig led a group of about 20 people on a tour of several varied ecosystems in the Grand Staircase - Escalante National Monument (GSENM) where he has done extensive fieldwork. One site was a section of land that had been the subject of a restoration attempt by BLM: it was a sad illustration of the problems and difficulties that had been outlined in the previous night's talk. The other sites were much closer to native habitats, with varying soil types and microclimates giving rise to different plant communities.

Even more people showed up for Sunday's hike into Lick Wash, again ably led by Walt. This was a fascinating trip into a deep shaded canyon where the air is consistently much cooler than open countryside at the same elevation. This creates an "upside-down mountain" in which plants thrive at lower elevations than would normally be possible – large Ponderosa Pines grow in the canyon bottom! Near the mouth of the wash we visited a population of the very rare Paria Breadroot (*Pediomelum pariense*), a plant that was the subject of research by Ashley Egan, with funding from UNPS. Probably the favorite for most people was Lori's Columbine (*Aquilegia loriae*) which prefers almost inaccessible cracks in the canyon walls. It was discovered in 1995, and grows nowhere except Kane County.

On Saturday afternoon we held a short meeting for those members of the UNPS board who were present. In the evening there was a pot luck dinner and social hosted by Jana de Peyer at her home perched on the rim of Kanab Canyon. It was a wonderful event: thanks to Walt and Jana, and all the members of the Manzanita Chapter who worked to make it a success.

Although we didn't reach a quorum for the board meeting we had a very useful discussion of several issues that will be taken up by email discussion and at other meetings. One subject was funding a research proposal by Dorde Woodruff who has been studying Utah's cacti, especially *Sclerocactus*, for several decades. Dorde has also written some fine articles for *Sego Lily* in the past year, and given talks at chapter meetings. Subsequently the full board

voted to approve the award, which will enable her to travel to study sites around the state.

Another subject concerned UNPS's role in working actively on behalf of Utah's rarest plants, those in the federal "Threatened or Endangered" category. As several articles in *Sego Lily* have discussed, there have been strong efforts to remove federal protection from some of these species, most recently *Penstemon grahamii* and *Astragalus desereticus*. In these particular cases (though not in several others), we have joined in active opposition because we feel that the best available science is not being used to judge whether the plants are no longer in danger. In some cases there is a "Catch 22", in that federal funds are not always available to get the science done. I would like to see UNPS play a positive role in building up the scientific database on some of these plants. We have a great body of trained botanists among our members, and quite a few very knowledgeable amateurs. I propose that we establish a pool of UNPS volunteers who could assist with surveying for rare plants, and offer to work in conjunction with the agencies when appropriate. I shall be contacting many of you directly, but please get in touch with me if you would like to find out more. - Bill Gray (cyberflora@xmission.com)

Below: Relentless in pursuit of a rare plant photo op, UNPS President Gray stalks the wily Lori's columbine in Lick Wash. Photo by W. Fertig, inset of Lori's columbine by Bill Gray



Plant Life of Cedar Breaks National Monument

By Doug N. Reynolds

Because the growing season at Cedar Breaks is so short due to its high elevation and heavy snowfall, all species must flower and reproduce in just a few months rather than the typical six month growing season at lower elevations. This seasonal compression, along with protection from livestock grazing, ATV's, and other human disturbance leads to a spectacular flowering display during the short summer. The high elevation also allows many northern circumboreal species to flourish at or near their southernmost distribution.

Scientists have noticed that for every thousand feet you climb in our western mountains, temperatures drop three to four degrees Fahrenheit and the plant life changes as if you had traveled six hundred miles north. Thus, leaving Cedar City on the drive up to Cedar Breaks, you start out in the Great Basin Desert of sagebrush and saltbush at 6000 feet, pass through Pinyon-Juniper Forest, enter the Mixed Conifer Zone of Ponderosa pine, White and Douglas firs, and finally arrive at the CEBR visitor center at 10,350 feet in the Engelmann Spruce - Subalpine Fir Life Zone surrounded by forests similar to those found in Alaska.

Cedar Breaks National Monument itself only encompasses elevations from about 8000 to 10,500 feet and the upper two life zones. The accessible portions along the road and trails all lie within the Spruce-Fir Zone. But even within this one zone and its cool, moist climate and short growing season, there are four very different habitats for plants depending upon exposure, slope, soils, and drainage. Each of these habitats has a different group of plant species that are adapted to its special conditions.

The Rim of the Breaks

Here are some of the harshest conditions for plant life in the Monument. These areas are exposed to all of the elements: strong winds, intense sunlight, blowing snow, freeze-thaw cycles, and intense thunderstorms. Only tree species like the Bristlecone and Limber pines can eke out an existence here. But the most diverse group of plants are the non-woody plants showing the "cushion growth form". They grow low to the ground, out of the cold wind, where temperatures can be 10 degrees or more above air temperature. Most of their bodies lie underground in a root system that anchors them and stores their energy reserves in a protected environment. The exposed soils of the Claron Formation here are easily erodible and have an unusually high pH which affects the availability of nutrients for growth and makes it difficult for plants to establish. Because of these special soil conditions, there are a number of



Above: Rim of Cedar Breaks Amphitheatre showing white and red layers of the Claron Formation derived from an ancient lakebed. Photo by D.N. Reynolds.

species such as Cedar Breaks gilia (*Ipomopsis tri-dactyla*), Podunk groundsel (*Senecio malmstenii*), and Maguire campion (*Silene petersonii*) that grow almost nowhere else except on similar soils between Cedar Breaks and Bryce Canyon. Other common species found are Desert parsley (*Lomatium minimum*), Cushion phlox (*Phlox pulvinata*), Sulfur buckwheat (*Eriogonum umbellatum*), and Mountain locoweed (*Oxytropis oreophila*).

Spruce-Fir Forests

Where trees are able to establish at these high elevations, Engelmann spruce and Subalpine fir form the dominant forest type. Groves of Aspen may also be found in areas where there have been past disturbances although they are eventually replaced by the conifers. These forests trap snow, and the shade provided by the trees slows melting and lowers evaporation so that there is more moisture and less wind than out on the rims. As a result, the understory is much lush and dominated by tall, upright, herbaceous plant species like Colorado columbine (*Aquilegia caerulea*), Southern ligusticum (*Ligusticum porteri*), and Aspen bluebells (*Mertensia arizonica*). While many visitors think that the death of Engelmann spruce trees from an epidemic of bark beetles is unfortunate, the gaps created by the dead trees allow in more light which benefits the understory plants and increases their growth and flowering.

Cedar Breaks Wildflower Photography: Zion Canyon Field Institute is offering a one-day workshop on wildflower photography at Cedar Breaks on Wednesday, July 11, hosted by professional photographer Michael Plyler. See the Zion Natural History Association website (www.zionpark.org/prod.php?id=30) for more information on this and other summer and fall programs.

Open, semi-moist meadows

Back from the rims where there is more protection from the wind, snow accumulates over the winter on the gentle slopes and protects the underlying plants. As the snow melts in the spring and provides a good water supply, we find the greatest diversity of species and the most spectacular wildflower displays in summer. Here the meadows are filled with such species as the endemic Markagunt penstemon (*Penstemon leiophyllus*), Elkweed (*Swertia radiata*), Little sunflower (*Helianthella uniflora*), and Scarlet paintbrush (*Castilleja miniata*).

Subalpine Marshy Meadows

Snow accumulates to the greatest depths during the winter along drainages and in depressions. These are the last areas to melt out in the spring and the soils remain wet for most of the summer. Trees cannot establish here but we find another set of herbaceous plants adapted to the wet soils and short growing season. Species such as Marsh marigold (*Caltha leptosepala*), Plantainleaf buttercup (*Ranunculus alismifolius*), Shootingstar (*Dodecatheon pulchellum*), and Elephanthead (*Pedicularis groenlandica*) are amongst the most colorful and showy species found.

Long after hot temperatures and drying soils have ended the wildflower season over much of Utah's lower elevations, Cedar Breaks provides a spectacular locale for those who enjoy wildflowers as well as the geologic formations and scenic vistas.



Above: *Rydberg's penstemon* (*Penstemon rydbergii*).
Below: a colorful carpet of lupines and sunflowers above the rim of Cedar Breaks. Photos by Doug Reynolds.



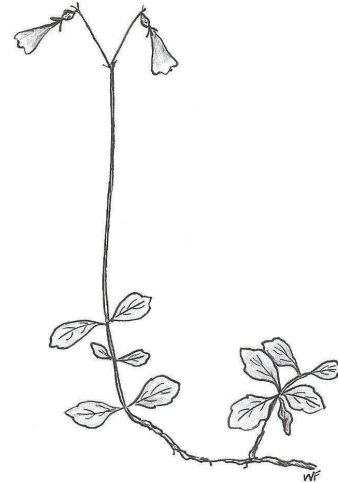
What's in a Name?

Linnaea

The genus *Linnaea* consists of a single species, *L. borealis*, distributed widely across the boreal forests or taiga of Northern Europe, Siberia, Alaska, and Canada, and south through the Sierra Nevada, Rocky Mountains, and Appalachians. The species is commonly known as Twinflower in recognition of its pair of nodding, pinkish-white tubular flowers at the tip of a short, Y-shaped stalk. Twinflower is an evergreen subshrub that spreads by trailing branches which form loose mats over shady conifer forest floors. Taxonomists recognize two varieties – the typical form with rounded leaves and short floral tubes found in Eurasia and western Alaska, and var. *longiflora* with more elliptic, toothy leaves and longer corollas from North America.

The name *Linnaea* commemorates Carl Linnaeus (1707-1778), the Swedish botanist from Uppsala University who invented and popularized the system of naming plants and other organisms used by taxonomists since the mid 1700s. Prior to Linnaeus, plant and animal names were not standardized, nor were the conventions for naming species. Plant names typically consisted of long descriptive phrases, or polynomials, such as *Conyza foliis ovalibus integerimus scabris subtus hirsutus* (roughly translated as “Horseweed with oval leaves covered with rough and stiff hairs”). Linnaeus’ chief innovation was developing a unique two-word name (or binomial) for each species (such as *Conyza hirsuta* for the Hairy horseweed). The generic name (i.e. *Conyza*) was the equivalent of a family surname and was used by Linnaeus to group species of similar appearance. The specific epithet (i.e. *hirsuta*) was analogous to a person’s first name and was used as an adjective to identify and briefly describe each unique member of a genus. This relatively simple concept, first published by Linnaeus in *Species Plantarum* in 1753, revolutionized the study of natural history by allowing researchers to better communicate among themselves and to name the vast number of new species being documented around the world during the Age of Discovery.

Linnaeus also devised an early system for classifying the world’s plant diversity based on the number of stamens and pistils in a plant’s flower. This “sexual system” was widely regarded as artificial even in its day (including Linnaeus himself), but was useful for bringing some order to an otherwise chaotic mishmash of plant taxa. The sexual system was also considered somewhat scandalous in the mid 1700s for its racy terminology that implied various numbers of wives (pistils) and husbands (stamens) within the same bed (flower). Johann Siegsbeck, a botanist who oversaw the czar’s botanical garden in St. Petersburg, was particularly offended by the sexual system and banned Linnaeus’ papers from



Above: *Linnaea borealis* reaches the southern edge of its range in the Rocky Mountains of Utah, occurring sporadically from the Uinta and Wasatch ranges south through the Wasatch Plateau to the Tushars. Illustration by W. Fertig

Russia. Linnaeus, whose intellect was coupled with a streak of vanity and pettiness, had his revenge by naming a small genus of unattractive sunflowers *Siegsbeckia* in “honor” of his critic. The sexual system quickly fell out of favor for more legitimate, scientific reasons as botanical scholars such as Adanson, de Jussieu, and de Candolle began critically studying fresh and herbarium material from across the globe to identify more natural features to depict relationships among genera.

According to legend, Twinflower was one of Linnaeus’ favorite wildflowers and became his official floral emblem when he was granted nobility by the Swedish crown in 1761 (becoming Carl von Linne). Twinflower was originally thought to be a *Campanula* (harebell), but was renamed *Linnaea borealis* by J.F. Gronovius, a Dutch botanist and early mentor of Linnaeus. In a bit of uncharacteristic self-mocking, Linnaeus noted in *Species Plantarum* “*Linnaea* was named by the celebrated Gronovius and is a plant of Lapland, lowly, insignificant and disregarded, flowering but for a brief space - from Linnaeus who resembles it.” The International Code of Botanical Nomenclature recognizes Linnaeus’ 1753 publication as the starting date for all valid plant names, and so *Linnaea borealis* is now attributed to Linnaeus as the author, giving the false impression that Linnaeus named the genus and species for himself (a serious error in taxonomic etiquette, and one that is avoidable by getting grad students or peers to do such naming for you!).

The name Linnaeus also commemorates another plant group. Linnaeus' father, Nils (son of Inge-mar), adopted the surname Linnaeus out of necessity when he entered University in the late 1600s. The name is derived from the Swedish word lind or linden (*Tilia cordata*), perhaps better known in North America as basswood.

Traditionally, *Linnaea borealis* has been placed in the honeysuckle family (Caprifoliaceae). It is somewhat anomalous within this family in having only 4 stamens and in its bristly, indehiscent fruits. Recent genetic and morphological analysis of the Caprifoliaceae has suggested that the group is artificial and should be subdivided. In 1998, Swedish botanist Anders Backlund and his Belgian collaborator Nancy Pyck proposed a new family, Linnaeaceae, for the twinflower. Perhaps it should be no surprise that Dr. Backlund hails from Uppsala University – long time academic home of Carl Linnaeus.

- Walter Fertig



Above: Modified leaf tip of *Nepenthes bicalcarata*, a pitcher plant from Indonesia. Most *Nepenthes* species have their leaf tips modified into an urn-like pitcher filled with liquid that dissolves arthropods unfortunate enough to get trapped inside. Illustration by W. Fertig.

Botanica (Or Odds and Ends from the Botanical World)

Carnivorous Plant Turns Vegetarian

Because of their peculiar habit of trapping and consuming insects and other small animals for nourishment, carnivorous plants are among the most intriguing species in nature. The carnivorous habit has evolved independently among several groups of plants, including the Venus flytrap (Dionaeaceae), sundews (Droseraceae), bladderworts (Lentibulariaceae), and pitcher plants (Sarraceniaceae and Nepenthaceae). Most insectivorous plants occur in nitrogen-poor soils where consumption of animal protein gives them an advantage over more traditional, solely photosynthetic plants.

But one carnivorous plant in southeast Asia and New Guinea has apparently had a change of heart. *Nepenthes ampullaria* is one of 80 some species of carnivorous vines and climbers in the genus *Nepenthes* found in tropical areas of Asia, Indonesia, and northern Australia. Most *Nepenthes* species have jug-like structures at the tips of their leaves (actually modified tendrils) capped by a small leafy awning to capture insects. The jug is filled with weakly acidic fluid (about the same acidity as soda pop) that is used to slowly dissolve the nutritious tissues of trapped prey. The rim and upper lining of the jug is smooth and slippery, causing visiting insects to fall into the caustic pool below and preventing their escape.

N. ampullaria has the jug-like leaf tips of typical *Nepenthes*, but instead of climbing over other vegetation grows at ground level. It also lacks the leafy cap and slick inner-lining of the jug. Instead of trapping insects, *N. ampullaria* has evolved to catch and

consume falling leaves. This vegetarian pitcher plant captures nutrient-rich leaf debris that would otherwise land on the ground, ensuring a meal for itself rather than soil bacteria and fungi.

All of this begs the question: does eating leaves make a plant a cannibal? – Walter Fertig

What is Troubling Our Oaks?

Reports are coming in from all along the Wasatch Front this spring of sickly looking Gambel's oaks (*Quercus gambelii*). For the most part the trees began the season in good health and produced a normal complement of leaves and shoots. But then in early June the leaves became withered, stunted, and brown. Concerned plant lovers began to worry – was it pollution, global warming, or disease?

There is some justification for worrying about oaks these days. Several diseases have played havoc with the oak forests of northern California and southern Oregon over the past decade. Sudden Oak Death, a disease caused by a fungal pathogen related to the Potato Blight, has killed an estimated 100,00 Tan, Black, and Coast live oaks in California by attacking bark, wood, and leaves. Oak Wilt, caused by a different fungus, has also claimed a large number of trees by clogging their vascular tissue. Foresters are concerned that these and other oak diseases could spread to new areas where oaks are abundant.



Above: Wilted leaves of Gambel's oak by Dave Wallace, June 2007.

Fortunately, the explanation for the poor vigor of our Wasatch oaks is probably more benign. The cold snap in early June (which resulted in heavy, late spring snow at higher elevations) appears to be the culprit. Although oaks are generally adapted to avoid frosts by leafing out later than many other trees, they can still be tricked by an unusually late cold spell. Young trees and seedlings are especially sensitive to frost, which helps explain the absence of Gambel's oak much above 9000 feet and their striking rarity across the state line in Wyoming. Hopefully a fresh crop of leaves (held in reserve in unopened buds) should emerge shortly to replace those lost to the cold. – Walter Fertig

TNC Acquires First Portion of White Dome Preserve

By Elaine York, TNC

The Nature Conservancy has announced its purchase of 55 acres of habitat in St. George. The purchase is the first step in an ambitious plan to create a new 800-acre preserve that will benefit several globally rare and federally-listed species in Washington County. Located in the fast-developing "South Block" in south St. George, the preserve will provide an oasis for plants, animals and people—with plans in the works for public nature trails and educational signage.

Working with a diverse range of partners, including the School and Institutional Trust Lands Administration (SITLA), the Bureau of Land Management (BLM), the Utah Department of Transportation (UDOT), the U.S. Fish and Wildlife Service (FWS) and the City of St. George, The Nature Conservancy has laid out plans for the creation of the

"White Dome Nature Preserve," which would protect habitat for several at-risk species, including the harbor some of last remaining populations of the Threatened Siler pincushion cactus, zebra-tailed lizard and loggerhead shrike, as well as extremely rare native wildflowers. The Preserve will harbor some of last remaining populations of the Threatened Siler pincushion cactus, *Pediocactus sileri*, and the Endangered dwarf bear poppy, *Arctomecon humilis*—which is found in Washington County and nowhere else on Earth.

The purchase was funded through private donations from Conservancy supporters and funding from FWS. The purchase marks the first phase of acquisition in a plan that was initiated in 2005 when SITLA signed an agreement to make 800 acres in the South Block available for sale to the Conservancy and UDOT with the intention of establishing a nature preserve with public-access hiking trails.

Additional land acquisitions in the South Block by the Conservancy and UDOT will take place in 2007-2008, with a goal of piecing together all 800 acres of the White Dome Nature Preserve. The Nature Conservancy is seeking additional private funds from individuals and companies for future White Dome acquisitions. Every little bit helps, so please contribute if you can. For more information contact Alice Storm at (801) 238-2337 or astorm@tnc.org.



Above: Dwarf bear poppy (*Arctomecon humilis*), quite possibly THE most charismatic and endangered plant in Utah, will receive a boost with the protection and fencing of habitat on White Dome, just south of St. George. Photo by W. Fertig.

Botanist's Bookshelf

Flora of North America Reaches Halfway Mark

By Nancy Morin

More than 900 botanists, working as part of the Flora of North America project, have now cataloged over half of the genera of higher plants native or naturalized in North America north of Mexico and hope to finish by 2011. This is the first comprehensive and scientifically authoritative publication treating the 20,000+ species of plants in U.S. and Canada together.

Thirteen volumes have been published (including an introductory volume), one is being printed, and publication of two more is expected this year, out of a total of 30. The second volume of grasses (Poaceae, Volume 24) came out in early 2007, completing the monocotyledonous plants. The first of three volumes on mosses, liverworts, and hornworts is in press. Especially exciting was the publication of all three volumes on the sunflower family (Asteraceae, Vols. 19, 20, 21) last year. The treatments include identification keys, nomenclatural information, common names, descriptions, distributions (including maps), and discussions. Every genus and 1/3 to 1/6 of the species is illustrated.

FNA makes many lifetimes of study, and the best knowledge from regional floras, available in print and electronically. Editorial centers are located at Missouri Botanical Garden, the Hunt Institute for Botanical Documentation, Université de Montréal, and University of Kansas. Authors base their work on knowledge of plants in the field, herbarium specimens, and review of the literature. The project also has a network of regional reviewers. Authors and editors work as volunteers; grants and donations support technical editors and botanical illustrators. The books are published by Oxford University Press--US and currently are on sale at the discounted price of \$76/volume (available at www.oup.com/us/fnaserie with promo code 25316). More information on Flora of North America and treatments from published volumes are available at www.fna.org.

For more information contact Nancy R. Morin, FNA Business Office, P. O. Box 716, Point Arena, California, 707/882-2528, nancy.morin@nau.edu.

Growing Native Plants of the Rocky Mountain Area.

By Robert D. Dorn and Jane L. Dorn. 2007. 252 pages. Book version: \$82.94 plus postage, available at www.lulu.com/content/768231. CD-rom version: \$7.50 plus postage, available at www.lulu.com/content/787924.

Review by Walter Fertig

Perhaps unique among all animals, humans have an innate need to garden. The earliest gardeners (dating back 14,000 years) were driven primarily by a need for food and fiber. Besides cereal grains, some of the earliest edible crops grown by people included showy flowers such as dahlias, sacred lotus, violets, and primroses. These latter species eventually fell out of favor as new edible species were brought into cultivation, yet they continued to be grown into modern times. Though we may never know if our Neolithic ancestors had an aesthetic sense, is it so far-fetched to assume that they didn't also enjoy the beauty of the crop flowers that they grew?

Nearly as ingrained as the need to garden is the desire to grow new and unusual plant species. Since the 15th Century, European explorers and traders have scoured the Earth for previously unknown plants to name, categorize, and introduce into horticulture. While many introduced species have been beneficial, others have escaped to become serious pests, disrupting natural habitats, displacing vulnerable native plants, and competing with more desirable crop species for space and nutrients.

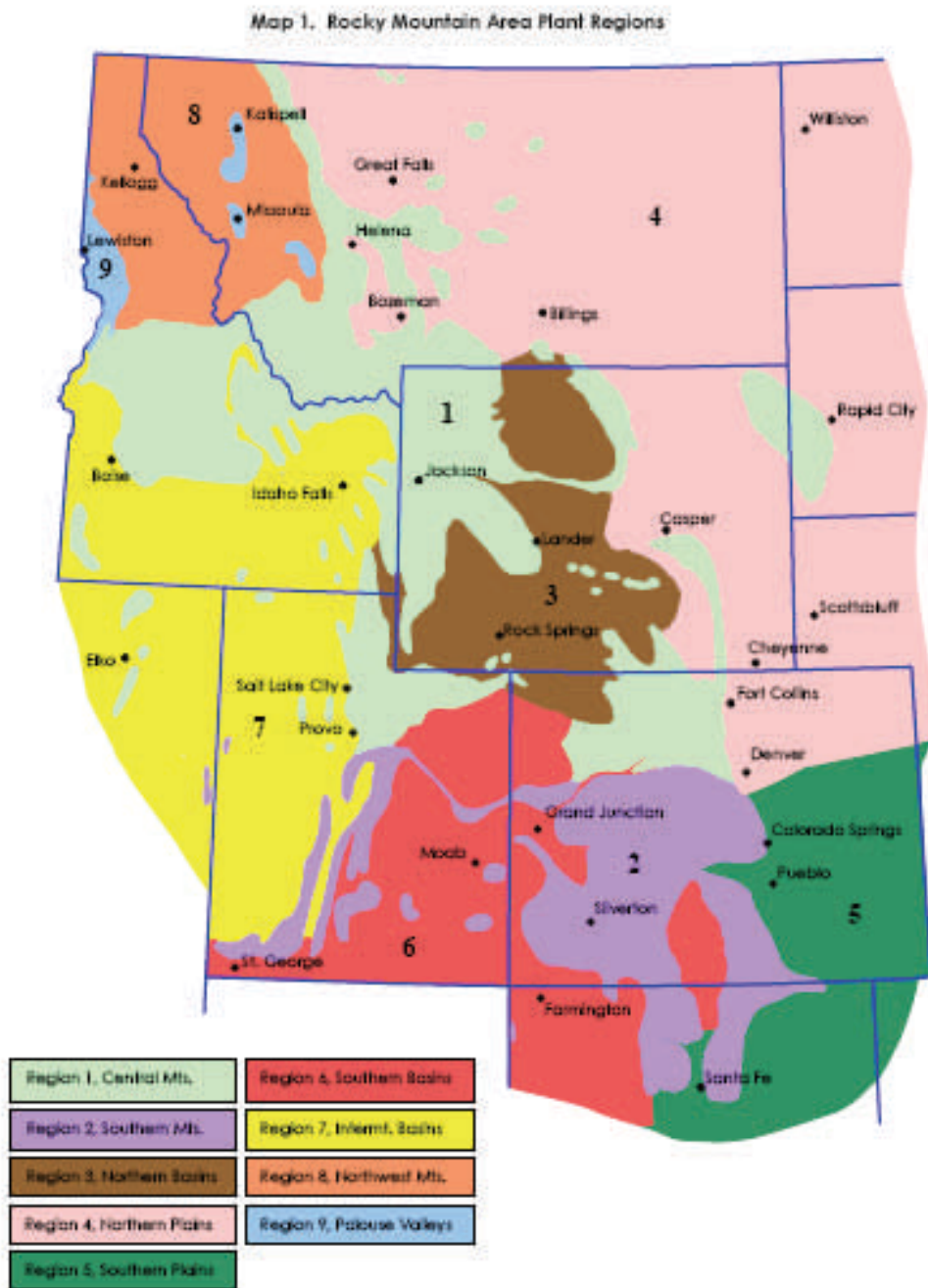
The invasive species crisis has contributed to a renewed interest in using native plants in gardens and public landscaping. Natives are increasing in popularity due to their adaptability to local soils and climates and because they usually require less water and less care once established. Gardeners are also learning that native species are just as attractive as introduced species. With rising demand, natives are becoming more readily available commercially.

The surge in popularity of native plants is reflected in the growing number of books devoted to native plant cultivation and garden design. A new entry into this field is *Growing Native Plants of the Rocky Mountain Area*, self-published by Robert and Jane Dorn. The Dorns are among the best known botanists and naturalists of Wyoming, having written the state's most comprehensive plant identification manual and a popular guide to Wyoming birds and birding areas. This foray into horticulture may seem like a new direction, but actually the Dorns are long-time amateur native plant gardeners in eastern Wyoming. Their 30 plus years of experience growing Rocky Mountain native plants, coupled with their intimate knowledge of the regional flora, is captured in this new book.

Unlike many other native gardening books on the market, *Growing Native Plants of the Rocky Mountain Area* is geared specifically for the demanding growing conditions of the Rocky Mountain states (defined by the Dorns as all of Montana, Idaho, Wyoming, Utah, and Colorado, the NE corner of Nevada, northern New Mexico, and the western quarter of the Dakotas and Nebraska). Dorn and Dorn have recognized that the conventional USDA hardiness zone criteria (based on the average lowest winter temperature of an area) are inadequate in predicting how well many native and non-native plants will adjust to the Rocky Mountain climate where temperature extremes (as great as 140 degrees F between

summer highs to winter lows) truly dictate which plants will persist. In place of the familiar USDA system, the Dorns have developed a more appropriate, ecologically-based system for classifying the 9 major plant regions of the Rocky Mountains. Each plant region has a characteristic flora shaped by differences in soils, topography, and the timing and quantity of

Below: Map of 9 major plant regions of the Rocky Mountain states from Dorn and Dorn (2007), reprinted with permission.



precipitation. By recognizing the needs of a particular species according to its preferred plant region, the home gardener has a better chance of identifying plants that will be suited for their particular garden. Homeowners can also make better decisions about what specific microsites are best suited for a particular plant (such as warm, south-facing slopes for drought-hardy species), or whether they will need to ameliorate their growing conditions through seasonal irrigation or soil treatments. For example, New Mexico locust (*Robinia neomexicana*), a common flowering shrub from the Southern Mountains Region of south-central Colorado, the Utah High Plateaus, and northern New Mexico, is adapted to the high summer precipitation of this region. Thus, it may not thrive in otherwise similar mountainous areas that lack a monsoon unless supplemental moisture is provided. This kind of Rocky Mountain-specific gardening information is often lacking in other guides that are geared for more general, widespread audiences, or assume everyone has great loamy soil, adequate water, and plenty of frost free days (ok for California maybe, but not perhaps for Panguitch, or Ogden, or where you actually live).

The introductory chapters describe specific environmental factors affecting plant distribution and survival (such as soils, moisture availability, topography, light, temperature, and snow cover), how these factors affect how a garden should be laid out to mimic natural habitats, treating weeds, plant pests, and how to attract birds. Scattered among these chapters are seven “principles” that pithily summarize the take-home lessons of gardening with native plants in the Rockies. These principles all seem straightforward (e.g. principle 5: “the major enemies of plant seedlings are not enough water, too much water, molds, animal consumers, and competition from other plants”), but all provide a succinct summary of the typical errors novice gardeners make when trying to grow new plants. There are books that go into greater detail on all of these topics, but the Dorns have done a nice job of condensing these concepts into one easy to comprehend reference appropriate to our local conditions.

Most of *Growing Native Plants* is devoted to a full color section describing over 400 native tree, shrub, grass, and wildflower species suited for garden use in the Rocky Mountain region. The species accounts include information on which of the nine regions of the Rockies the plant is best suited for, along with a brief description of its growth habit and appearance, habitat, cultivation, and means for propagation. The photos accompanying the descriptions are of high quality and large size (one of my pet peeves with many horticulture books is how tiny and grainy the photos are) and show just how beautiful our native

Aconitum columbianum

ack-oh-nite-um ko-lum-bee-an-um

Common Name: Monks-hood



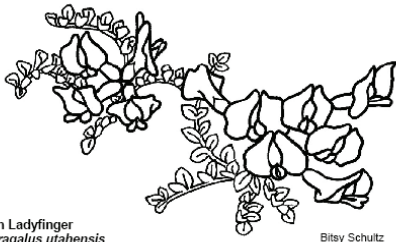
Above: Sample from Dorn and Dorn (2007).

plants can be. For those who are not swayed by appeals to reduce global homogenization, save water, or lessen demands for fertilizer, the photos alone are perhaps the best promotion for going native.

Plant descriptions are arranged alphabetically by scientific name. This may prove a challenge for those who are squeamish about taxonomic names (especially since the nomenclature follows more recent treatments and uses some unfamiliar names for asters, ricegrass, and others). Fortunately the index is cross-referenced by widely used common names and taxonomic synonyms. Besides, if a gardener can learn to recognize “common” names like Chrysanthemum, Forsythia, and Geranium (all Latin genus names too), they can expand their vocabulary with a few more native scientific names! The book concludes with several appendices depicting sample precipitation tables, examples of designing plant beds, and tables comparing various attributes of the species described previously.

Growing Native Plants of the Rocky Mountain Area is currently available in printed form for conventional bibliophiles, or as a cd-rom for the technosavvy or bargain-hunter. Me, I’ll stick with the printed version and read it in the comfort of a hammock and enjoy the solitude of being away from the computer while I’m planning for my native garden-in-progress.

Note: For a limited time, individuals interested in purchasing the book version of *Growing Natives* can do so directly from the Dorns for \$50 (postage included) through Mountain West Environmental Services (contact Bob Dorn at inglebird@yahoo.com for details).



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September 2007 Volume 30 Number 5

Exotic Plants of Utah

The Limits of Restoration in an Age of Weeds

By Douglas N. Reynolds

Weeds have afflicted humanity for hundreds of years as evidenced by the following quotations:

Cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life; thorns and thistles shall it bring forth to thee.

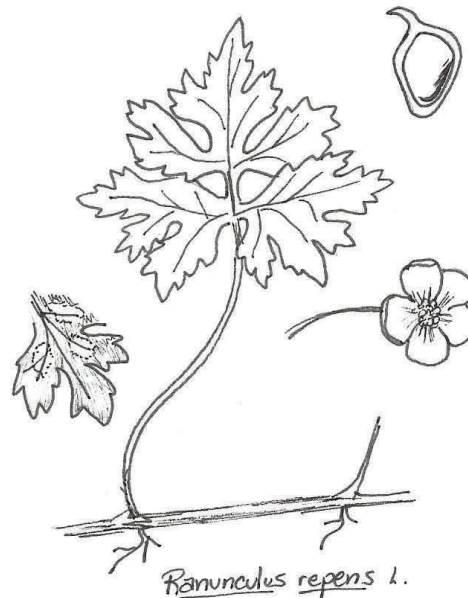
- Genesis 3:17-18

I will go root away the noisome weeds, which without profit suck the soil's fertility from wholesome flowers.

- W. Shakespeare, *Richard II*

While weeds have long had serious economic effects when they establish and compete with agricultural crops, what should concern members of a native plant society most are weeds' exponentially-increasing effects on natural communities. The Plant Conservation Alliance estimates that more than 1000 weed species are invading natural plant communities in the United States alone. As human impacts intensify through livestock grazing, off-road vehicle use, and other disturbances, it is estimated that 4600 acres of western Federal lands are invaded each day and that more than 40% of the species on the Endangered List are at risk from invasive species. Weeds impact native species not only through direct competition for light, water, and

Continued on page 5



Above: Creeping buttercup (*Ranunculus repens*) is a native of Eurasia that has become widely established across North America. This species can be recognized by its compound leaves and ability to root at the nodes. A many-petaled form (var. *pleniflorus*) is sometimes observed, but most individuals have 5 petals (var. *repens*). Illustration by W. Fertig.

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Website: For late-breaking news, the UNPS store, the *Sego Lily* archives, Chapter events, links to other websites (including sources of native plants and the digital Utah Rare Plant Field Guide), and more, go to unps.org.
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

Sego Lily Editor: Walter Fertig (walt@kanab.net). News items, articles, photos, and illustrations from members are always welcome. The deadline for the November 2007 *Sego Lily* is 15 October 2007.

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Chapter News

Escalante (Garfield County): After taking a couple months off to enjoy the summer, the Escalante Chapter met on August 14 to enjoy a program on local area tree and shrub identification. Cindy Calbaum and Amber Hughes presented the program using plant cuttings and an identification key prepared by Cindy.

The Escalante Chapter has decided to meet formally only every other month for a while to determine if this schedule works well. Future programming through the end of the year includes:

October 2 - Co-sponsoring with the Grand Staircase-Escalante National Monument Walks & Talks program - Jeff Sanders – “Rainwater Harvesting 101”.

October 5-6 - Hosting a table at the Escalante Canyons Arts Festival.

October 9 - Chapter Meeting & Program by Doug Reynolds – “Restoration Work and Native Plants”

December 11 - Holiday Party. – *Allysia Angus*

Manzanita (Kane County): Our September 4th meeting will be an evening hike to the ‘underground lake’ off Kanab Creek Canyon in the Best Friends Animal Sanctuary. The lake itself is too dark for plant life,

but the surrounding canyon has a rich flora and offers some great vistas. Plan to meet at the Best Friends Welcome Center parking lot at 6:30 PM to carpool or caravan a short distance to the John R Flat Road and Kanab Creek. The hike will continue until dusk. The area is very sandy, so appropriate footwear is recommended. – *W. Fertig*

Salt Lake: During the course of the summer, four hikes were held by the chapter. In May, several members visited the blooming Claret Cup cacti in the mouth of Parleys Canyon. During the hike, the members also enjoyed the native foothill wildflowers and several introduced Utah native penstemon species. In July, members hiked up to Twin Lakes in Big Cottonwood Canyon. The wildflowers were spectacular and the weather was very pleasant. Another hike took members up to the peak at Bald Mountain. Despite a late Spring, and dry conditions, many alpine plants were in full bloom, particularly the Sky Pilots. At the end of July, a hike was held in the Albion Basin in Little Cottonwood Canyon. The meadows were a carpet of color and contained paintbrushes, monkeyflowers, geraniums, delphiniums, bog orchids, eriogonums, erigerons, and penstemons. Participating members had a wonderful time!

Friday September 7th, 6:30 pm: Potluck Social at the Sugarhouse Garden Center, 1602 East 2100 South, SLC. After the Summer break, we will join the Wasatch Rock Garden Society for a potluck social and an opportunity to share photos of the plants you photographed this year. An old-fashioned slide projector will be available. For digital projection, please contact Bill Gray (532-3486) in advance so that he can facilitate that process with his equipment. Please bring a dish to share for the potluck. Any questions, call Cathy King 582-0432 or 867-3595.

Saturday September 8th, 8:00am-2:00pm: Garden Fair at the Jordan Valley Water Conservancy District Demonstration Garden, 8215 South 1300 West, West Jordan. The SL Chapter will have a booth with information on native plants. There will be food, music, plant vendors, and experts on hand to answer all your questions about water-wise landscaping. For more information visit the website: www.ConservationGardenPark.org.

Wednesday October 3rd, 7:00pm-8:30pm: REI, topic to be announced.

Our meeting location is at REI on 3285 East 3300 South in the Wasatch Conference Room. This location is readily accessible from I-80 and I-215. Meetings will usually be the first Wednesday of the month, at 7:00 pm. The success of the Chapter is dependent upon its members. If you have any ideas for events or topics, or want to give a presentation, please contact Kipp at kipp_lee@comcast.net or 759-6204. Any ideas or recommendations are welcome! - *Kipp Lee*

Utah Valley (Utah Co): Plants and Preschoolers – every Thursday at 10 AM we are having our ‘Plants and Preschoolers’ hikes. The hikes are short distances and everyone is welcome to explore as we go. This summer we returned to Cascade Springs, Rock Canyon, the Grotto in Payson Canyon, and the falls hike in Pleasant Grove, and we tried a new hike at Sundance and visited the UCWCD garden. We have plans to visit Coalville, and in the fall Hobble Creek. We will also venture up the South Fork of Provo Canyon, American Fork Canyon, and the Shoreline Trail as the temperatures become more pleasant. If you are interested in joining us, call Celeste Kennard at 801-377-5918 or email celeste.p.kennard@gmail.com.

Garden work- Anyone interested in doing some garden work on existing Heritage Gardens can call Celeste Kennard (phone and email listed above). – *Celeste Kennard*

Bulletin Board

Life Member Update: Paul and Catherine Thalmann of Escalante (summer) and Switzerland are the latest lifetime members of UNPS. – *Tony Frates*

Annual Members Meeting: As of press time we are expecting our Annual Members Meeting to be held in the Provo area on Saturday October 20, hosted by the Utah Valley chapter. This is the occasion when members statewide get together to enjoy good food (a traditional "New World" pot luck dinner), hear an expert speaking on some topic of Utah's native plants, and elect a new slate of members to our board of directors.

To receive more details, please contact Celeste (801-377-5918; celeste.p.kennard@gmail.com), Mindy (801-699-5459; wheelermindy@yahoo.com) or Bill (801-532-3486; cyberflora@xmission.com).

Volunteers Needed for Clay Phacelia Restoration:

UNPS is a partner with the U. S. Fish and Wildlife Service, the Forest Service and other non-profits in restoring the federally endangered clay phacelia to more of its native habitat. To that end, the Uinta National Forest and the rest of the partnership are looking for volunteers to help plant phacelia seed on two steep shale sites near Highway 6 southeast of Spanish Fork Utah, on one or two Saturdays in the first half of September. If you are interested in volunteering, please contact Denise Van Keuren at 801-342-5179, or dvankeuren@fs.fed.us. – *Denise Van Keuren*

New Display Gardens at the Utah Central Water Conservancy District: The Utah Central Water Conservancy District (UCWCD) has undergone a dramatic change over the last year and the Utah County Chapter of UNPS is especially excited about the Native Utah Plant section that has been designed by our own Bitsy Schultz and will be installed this fall.

Like the Jordan Valley Water Conservancy District the new landscaping at UCWCD promotes water conservation and is designed to help the public become acquainted with water efficient plants and gardening practices. Classes have begun and will continue through September. Come attend a garden tour any Thursday evening at 6:30 pm or attend a class. A list of classes can be viewed at www.centralutahgardens.org or by calling 801-222-0123.

The UCWCD landscape differs from the Jordan Valley garden because many of the gardens have been designed on a slope rather than a flat surface. The site also has some great shady spots under the mature conifers in the Garden Gallery. Also our Plants and Preschoolers group visited the garden the day Bitsy Schultz was teaching. We found the classroom very inviting and the garden was a big hit with the little ones that had fun trying out the hand-on irrigation display and visiting the miniature houses that dot the Model Homes and Landscapes section.

UNPS will help install the Utah Native Plant Garden section in October and if you are interested in helping call Celeste Kennard at (801) 377-5918. – *Celeste Kennard*

The Limits of Restoration in an Age of Weeds (continued from page 1)

nutrients but indirectly by altering ecosystem processes such as soil erosion, hydrologic regimes, and fire cycles.

What exactly constitutes a weed is often in the eye of the beholder; the simplest and broadest definition is a “plant growing where it is not wanted”. By this definition weed scientists, ranchers, and farmers often consider native species like sagebrush a weed when it invades agricultural lands or competes with desirable perennial grasses for grazing. From an ecological standpoint, a more limited and specific term is “exotic” or “alien”, denoting that the species is not from the local area and thus the native species are not adapted to its presence. Lacking native predators and diseases to control their population size, these are a danger to natural communities. Even worse are the aliens that are invasive, meaning that they have the ability to invade relatively intact native communities even little disturbed by humans. When these species alter ecosystem processes by increasing the frequency of fire or lowering the water table which further decreases native species, they set in motion a positive feedback cycle that destroys the original plant community and usually the animal community that depended upon it.

In 1974, Herbert Baker at UC Berkeley published a seminal article, *The Evolution of Weeds*, which enumerated the life-history strategies that allow weedy species to successfully invade and out-compete native species. Some of the most pertinent traits that we see in species invading Utah today are:

Seeds have adaptations for short and long-distance dispersal so that new areas are rapidly invaded.

Seeds remain viable in the soil and germinate under many conditions leading to rapid establishment and spread.

Plants can self-pollinate and/or are pollinated by wind or general pollinators so that seed production is frequent and copious.

Plants are tolerant and plastic and produce seeds as long as conditions permit; in a dry year they produce a few seeds and, under good conditions, many.

Plants compete interspecifically through rosettes, choking growth, or allelochemicals that decrease the growth and reproduction of natives.

Almost everyone knows the story of cheatgrass (*Bromus tectorum*), the poster child of invasive exotics, which has had such a devastating effect on ecosystems throughout the west. It exhibits almost every one of the characteristics on the list above. It



Above: Cheatgrass (*Bromus tectorum*) from Hitchcock (1950, revised by A. Chase) Manual of the Grasses of the United States. USDA Misc. Publ. 200., Washington DC.

is an annual which germinates with the fall rains, getting a jump on natives which don't germinate until spring. By then, the cheatgrass root system is already well-established to out-compete them for water and nutrients. Being very plastic, plants produce a few seeds under drought conditions, and in a wet year, a single plant can produce hundreds of seeds. As domestic livestock graze and weaken native grasses, their hooves disturb the ground, giving cheatgrass a good seedbed. Protected from grazing by sharp awns on the seeds and easily dispersed, cheatgrass rapidly spreads and fills the spaces between native perennials. When plants die in late spring they greatly increase the likelihood and spread of wildfires that further devastate native species that haven't finished their growth or reproduction. As a result, over ten million acres of Idaho and Utah are now monocultures of cheatgrass. The recent, huge Milford Flat fire in central Utah was enhanced by cheatgrass infestation resulting from livestock grazing and, now that the fire has destroyed or weakened the remaining native species, cheatgrass will come back even stronger. Many studies have shown that once cheatgrass invades, native species recover only slowly, if ever, even with the removal of further disturbance.

There are several other species that illustrate the invasive characteristics of weeds that I have been watching spread through healthy pinyon-juniper

and sagebrush communities outside of Cedar City. They are also rapidly spreading throughout other areas of Utah and the western states.

Tumble mustard (*Sisymbrium altissimum*) is a native of Europe and, like cheatgrass, is a winter annual and so gets a head start on most natives. It exhibits most of the characteristics listed above. It begins life as a rosette, often densely packed, which smothers other species. By late spring it bolts to produce a many-branched plant that can reach five feet tall and produce thousands of seeds. The plant dies in summer, breaks off at the base, and the delicate stem with its high surface area can roll with the wind, slowly releasing seeds, or even be lifted ten's of feet into the air to disperse seeds over large distances. The seeds can live for a long time in the soil and remain ready when conditions permit, successfully germinating and growing in a variety of soil types. In a single year I have watched tumble mustard fill a five foot wide strip along a 25 mile swath of Highway 56 between Cedar City and Newcastle where a new fiber optic cable was installed. This strip will now be easily ignited by a stray cigarette butt or spark and carry fire. It also provides a seed source for the invasion of the relatively healthy adjacent Pinyon-Juniper and Sagebrush communities of central and western Iron County.

Another rapidly spreading species is Bur Buttercup (formerly *Ranunculus testiculatus*, now *Ceratocephala testiculata*), a native of Eurasia. Another annual, it is one of the first to germinate and flower in spring. Very plastic, plants can produce from one to more than 100 sharp-tipped fruits, depending on conditions. These are spread by cattle and rapidly colonize the disturbed, open areas between shrubs in grazed communities. More frightening, I have watched it move into and establish in undisturbed soil crusts in healthy Pinyon-Juniper communities and worry that it may come to dominate these areas as well.

Weed invasions have been called "biological pollution" but unlike many kinds of pollution such as an oil spill, which happens and can be cleaned up, weed invasions are self-reproducing and evolving organisms that can adapt to new or changing conditions.

After the recent fires there has been a lot of talk about restoring the area by reseeding native species. Unfortunately, the chances of success are usually small and the process is very expensive. Seeds of native species have a limited availability and often cost many dollars per pound since they are not as easily grown and harvested as crop species. The source of the seed is also important; seeds produced by plants from a different state or habitat may not be well-adapted to the conditions in the areas where they are to be used. The semi-arid environment in Utah also makes restoration especially difficult because of low resource availability (water, nutrients, and topsoil). The environmental variation and harsh microenvironments of our climate limit periods of seedling



Above: Bur buttercup (*Ranunculus testiculatus* or *Ceratocephala testiculata*), an exotic from Eurasia that is spreading across Utah and the western United States at an alarming rate. Photo by Doug Reynolds.

recruitment. Many reseeding fail when a dry period or late frost follows germination and the new seedlings wither away. Even if new plants begin to establish, when the restored land is returned back to prior livestock use as the ranchers and politicians propose, the degradation of the native plant communities and weed invasion will resume again. In former times when reservoirs of exotic species weren't here, natural ecosystems could recover over time through natural processes. Now, the many exotic species, with all the adaptations listed above, are just waiting to invade. As more and more parcels of land are affected by human-caused fires, grazed by domestic livestock, or disturbed by off-road vehicles a ratcheting process begins in which more natural communities are lost each year to exotic monocultures, probably never to recover. Does it make economic sense in this age of weeds, given the few cents per acre received per year from grazing or ATV permits, to lose the native plant communities and the fauna they support?

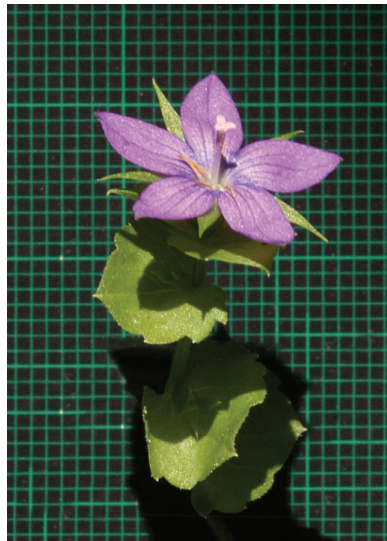
The scientific and economic answer to this question is simple: **Restoration is no substitute for conservation.** The costs in time, effort, and money are high and the chances of a successful restoration are low. And weed seeds are always waiting in the soil or in an adjacent area to begin their invasion again. One should always be suspicious when mitigation or future restoration is mentioned as an excuse to allow some new or continuing disturbance. We are limited by money, time, and knowledge in our ability to replicate natural communities and processes. It is far cheaper and smarter in the long run to prevent the introduction of new weeds or the disturbances that allow them to come in than to try and restore the invaded lands.

How on Earth did *They* get *There*?

City Creek Canyon descends from around 9000 feet into the heart of Salt Lake City. A road ascends about 6 miles up the canyon, then trails go up another 5 or 6. The road section is heavily used by bikes, runners, and walkers, but the upper trails scarcely at all. Parts of the canyon are infested with various weeds, noxious and otherwise: Cheatgrass, Yellow star thistle, Myrtle spurge, Houndstongue and Dalmatian toadflax. However, these tend to fade rapidly as one moves away from the road itself.

This year I have been exploring the various branches of the creek in search of two rare water-loving endemics, Wheeler's angelica (*Angelica wheeleri*) and Wasatch fitweed (*Corydalis caseana* ssp. *brachycarpa*). On this particular occasion I was in North Fork and had left the road with its disturbed habitats behind me. After following a trail for some distance I had to really bushwhack to stay anywhere near the stream, which was heavily overgrown. In this out-of-the-way place, growing within a radius of a couple of feet, were several plants each of two non-native species. One of them was Dalmatian toadflax (*Linaria dalmatica*), separated by perhaps a mile from the nearest roadside population. The other was Venus' looking glass (*Triodanis perfoliata*), which was completely new to me. Apparently it is quite widely naturalized in the US, but in Utah it is rare and hitherto found only in Washington and Kane counties. It seems most likely that it came from somebody's garden - even so that's a minimum of six miles away. Neither plant has seeds fitted for wind dispersal, and I doubt that any person or domestic animal had been by that spot in years, but here were two weeds growing side by side far from their nearest kin.

How on earth did they get there, and so close to each other? All I can surmise is that they fell in a single splash from a passing bird. Any other ideas? - *Bill Gray*



Above: Venus' looking glass (*Triodanis perfoliata*, Campanulaceae). Small squares = 1 mm. Photo by Bill Gray.

Number of Exotic Taxa in Selected Floras

State	# Exotic	# Exotic/log area
New York	1082	210.5
California	1025	182.6
Hawaii	861	203.8
Illinois	782	151.1
Utah	503	94.2
Colorado	492	90.6
Wyoming	348	64.4
North Dakota	171	32.5

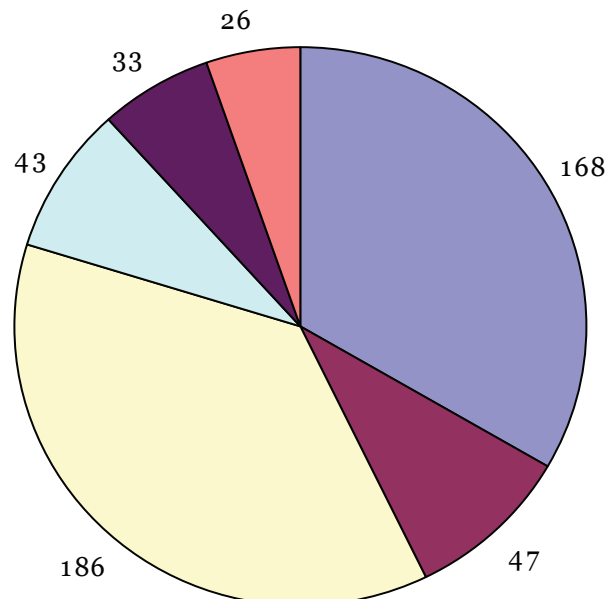
Source: Rejmanek & Randall (1994), Stuckey & Barkley (1993), & Fertig (unpublished data)

Statistical Summary of the Exotic Flora of Utah

Based on species and varieties cited for Utah in *A Utah Flora*, third edition (Welsh et al. 2003), the *Intermountain Flora* (Cronquist et al., eds. 1972-2005), and *Flora of North America* (FNA editorial committee, 1993-2007), 4273 plant taxa have been documented for the state. Of these, 923 are not believed to be native to Utah (21.6%). Excluding 420 non-native species that are known only from cultivation, 503 exotic taxa have become naturalized in the Beehive State (13.1% of the native and naturalized flora). The number of exotic species in Utah is relatively high compared to our neighboring states (see table at left), but still considerably lower than California, Hawaii, and many eastern states, especially when differences in area are normalized by a log function.

Nearly 70% of the exotic flora of Utah consists of forbs, about 18% are grasses or grass-like species (graminoids), and 12% are woody trees and shrubs. Annual forbs and graminoids comprise about 43% of the state's exotic flora (below).—*W. Fertig*

Exotics in the Utah Flora



Introduced and Naturalized Plants of Utah

By Walter Fertig

The following annotated checklist is derived from *A Utah Flora, third edition* (Welsh et al. 2003), the *Intermountain Flora* (Cronquist et al., eds. 1972-2005), and *Flora of North America* (Flora of North America Editorial Committee, 1993-2007). Introduced species that are known only from cultivation in Utah are not included. Each species is listed alphabetically by family and scientific name (following the nomenclature of Welsh et al. 2003). Additional information includes synonyms (in parentheses), common name, growth form (AF= annual forb, AG = annual graminoid, PF = perennial forb, PG = perennial graminoid, S = shrub, T = tree), and geographic area of origin (Afr = Africa, Aust = Australia, CAM = Central America, CNAm = central North America, ENAm = eastern North America, Eura = Eurasia, Euro = Europe, Med = Mediterranean, Mex = Mexico, OW = Old World [Eurasia and Africa], Rus = Russia, SAm = South America, Trop = tropics, TropAm = American tropics, TropAs = tropical Asia, WNA = western North America). State and county noxious weed status is derived from the Utah Weed Control Association website (www.utahweed.org). Counties include only those where a species is classified as noxious and not the plant's complete county distribution in Utah (county codes are based on the first four letters of the county name).

- Aizoaceae
Mollugo cerviana, Slender carpetweed, AF, Trop
Mollugo verticillata, Green carpetweed, AF, TropAm
- Amaranthaceae
Amaranthus albus, Tumble pigweed, AF, TropAm
Amaranthus deflexus, Large-fruit amaranth, AF, OW
Amaranthus lividus (*A. blitum*), Purple amaranth, AF, Euro
Amaranthus retroflexus, Redroot pigweed, AF, CAM
- Anacardiaceae
Pistacia atlantica, Atlas pistachio, T, Euro
- Apocynaceae
Nerium oleander, Oleander, S, Med
Vinca major, Grave-myrtle, PF, Euro
Vinca minor, Periwinkle, PF, Euro
- Bignoniaceae
Campsis radicans, Trumpet-vine, PF, ENAm
Catalpa bignonioides, Common catalpa, T, ENAm
Catalpa speciosa, Showy catalpa, T, ENAm
- Boraginaceae
Anchusa azurea, Blue alkanet, PF, Med
Anchusa officinalis, Bugloss alkanet, PF, Eura
Asperugo procumbens, Catchweed, AF, Eura
Borago officinalis, Common borage, AF, Euro
Cynoglossum officinale, Common hound's tongue, PF, Eura, **Co-Nox** (SanP, Wasa)
Echium vulgare, Common viper's-bugloss, PF, Euro
Lappula squarrosa (*L. echinata*), European stickseed, AF, Eura
Lithospermum arvense (*Buglossoides arvensis*), Gromwell, AF, Eura
Myosotis micrantha (*M. stricta*), Small-flower forget-me-not, AF, Eura
- Myosotis scorpioides*, Forget-me-not, PF, Euro
- Cactaceae
Opuntia humifusa, Eastern prickly pear, PF, CNAm
- Campanulaceae
Campanula persicifolia, Long-flower bellflower, PF, Eura
Campanula rapunculoides, Creeping bellflower, PF, Eura
Triodanis perfoliata, Venus'-looking glass, AF, Euro
- Cannabaceae
Cannabis sativa, Hemp, PF, Eura
- Caprifoliaceae
Lonicera japonica, Japanese honeysuckle, S, Asia
Lonicera tatarica, Tatarian honeysuckle, S, Eura
Symphoricarpos albus, White snowberry, S, WNA
Symphoricarpos orbiculatus, Coralberry, S, ENAm
- Caryophyllaceae
Arenaria serpyllifolia, Thyme-leaf sandwort, AF, Eura
Cerastium fontanum (*C. vulgatum*), Mouse-ear chickweed, PF, Eura
Dianthus armeria, Deptford pink, AF, Euro
Dianthus barbatus, Sweet William, PF, Eura
Dianthus deltoides, Maiden pink, PF, Euro
Gypsophila elegans, Showy babys-breath, AF, Euro
Gypsophila paniculata, Tall babys-breath, PF, Euro
Gypsophila scorzonrifolia, Glandular babys-breath, PF, Euro
Herniaria glabra, Herniaria, AF, Euro
Holosteum umbellatum, Holosteum, AF, Euro
Lychnis alba (*Silene latifolia*, *Melandrium dioicum*), White campion, PF, Euro
- Sagina procumbens*, Creeping pearlwort, PF, Eura
Saponaria officinalis, Bouncing-bet, PF, Euro
Silene armeria, Sweet-William, AF, Euro
Silene noctiflora, Night-flowering catchfly, AF, Asia
Spergularia marina (*S. salina*), Salt sand-spurrey, AF, Euro
Spergularia media (*S. maritima*), Greater sand-spurrey, AF, Euro
Spergularia rubra, Red sand-spurrey, AF, Euro
Stellaria media (*Alsine media*), Common chickweed, AF, Eura
Vaccaria pyramidiata (*V. hispanica*), Cow cockle, AF, Euro
- Chenopodiaceae
Atriplex heterosperma (*A. micrantha*), Two-seed orach, AF, Eura
Atriplex hortensis, Garden orach, AF, Eura
Atriplex rosea, Tumbling orach, AF, Eura
Atriplex semibaccata, Australia saltbush, PF, Aust
Atriplex suberecta, Sprawling saltbush, AF, Aust
Bassia hyssopifolia, Five-horn smotherweed, AF, Eura
Bassia prostrata (*Kochia prostrata*), Forage kochia, PF, Eura
Bassia scoparia (*Kochia scoparia*), Summer-cypress, AF, Eura
Chenopodium album var. *album*, Lambs-quarter, AF, Eura
Chenopodium ambrosioides, Mexican-tea, AF, Mex
Chenopodium botrys, Jerusalem-oak, AF, Eura
Chenopodium foliosum, Leafy goosefoot, AF, Eura (Reported in FNA 2003)
Chenopodium murale, Nettle-leaf goosefoot, AF, Eura
Chenopodium pumilio, Ridged goosefoot, AF, Aust
Halogeton glomeratus, Halogeton, AF, Eura

Utah Native Plant Society

- Salsola collina*, Slender Russian-thistle, AF, Asia
Salsola paulsenii, Barbwire Russian-thistle, AF, Eura
Salsola tragus (*S. kali*, *S. iberica*, *S. pes tifer*, *S. australis*), Russian-thistle, AF, Asia
- Compositae (Asteraceae)
- Ambrosia trifida*, Giant ragweed, AF, CNAm
Anthemis cotula, Mayweed, AF, Eura
Anthemis tinctoria (*Cota tinctoria*), Yellow chamomile, PF, Eura
Arctium minus, Burdock, PF, Eura, **Co-Nox** (Morg)
Artemisia abrotanum, Garden sagebrush, S, Eura
Artemisia absinthium, Absinthe, PF, Euro
Artemisia annua, Annual wormwood, AF, Eura
Aster exilis (*Symphotrichum divaricatum*), Saltmarsh aster, AF, WNAm
Aster novae-angliae (*Symphotrichum novae-angliae*), New England aster, PF, ENAm
Bellis perennis, English daisy, PF, Euro
Berlandiera lyrata, Green-eyes, PF, WNAm
Carduus nutans, Musk thistle, PF, Eura, **UT-Nox**
Carthamus tinctorius, Safflower, AF, Euro
Centaurea calcitrapa, Star-thistle, PF, Eura
Centaurea cyanus (*Leucantha cyanus*), Bachelor's button, AF, Euro
Centaurea diffusa (*Acosta diffusa*), Diffuse knapweed, PF, Med, **UT-Nox**
Centaurea jacea (*Jacea pratensis*), Broom knapweed, PF, Euro
Centaurea maculosa (*Acosta maculosa*, *C. biebersteinii*, *C. stoebe*), Spotted knapweed, PF, Euro, **UT-Nox**
Centaurea melitensis, Maltese star-thistle, AF, Euro
Centaurea montana, Mountain knapweed, PF, Euro
Centaurea moschata (*Amberboa moschata*), Sweet sultan, AF, Asia
Centaurea repens (*Acroptilon repens*), Russian knapweed, PF, Eura, **UT-Nox**
Centaurea scabiosa, Hardheads, PF, Euro
Centaurea solstitialis (*Leucantha solstitialis*), Yellow star-thistle, PF, Euro, **UT-Nox**
Centaurea virgata var. *squarrosa* (*C. triumfettii*), Squarrose knapweed, PF, Eura, **UT-Nox**
Chrysanthemum leucanthemum (*Leucanthemum vulgare*), Ox-eye daisy, PF, Eura
Cichorium intybus, Cichory, PF, Eura
Cirsium arvense (*Breea arvensis*), Canada thistle, PF, Eura, **UT-Nox**
Cirsium ochrocentrum, Yellow-spine thistle, PF, WNAm
Cirsium vulgare, Bull thistle, PF, Euro, **Co-Nox** (Beav)
Cnicus benedictus (*Centaurea benedicta*), Blessed thistle, PF, Med
Conyza bonariensis, Bonar horseweed, AF, SAM
Coreopsis tinctoria, Golden tickseed, AF, CNAm
- Cosmos bipinnatus*, Garden cosmos, AF, Mex
Crepis capillaris, Thread hawkbeard, AF, Euro
Dyssodia papposa, Pappose gland-weed, AF, CNAm
Emilia sonchifolia, Flora's paintbrush, AF, OW
Erigeron annuus, Annual fleabane, AF, Euro
Gaillardia pulchella, Firewheel blanket-flower, AF, CNAm
Gnaphalium luteo-album (*Pseudognaphalium luteoalbum*), Yellow-white cudweed, AF, Euro
Gnaphalium uliginosum, European cudweed, AF, Euro, Reported in FNA (2006)
Helianthus maximiliani, Maximilian sunflower, PF, CNAm, Reported in FNA (2006)
Helianthus pumilus, Little sunflower, PF, WNAm
Helianthus tuberosus, Jerusalem artichoke, PF, ENAm
Hypochaeris radicata, Cat's-ears, PF, Euro
Inula helenium, Elecampane, PF, Euro
Lactuca serriola, Prickly lettuce, AF, Euro
Lapsana communis, Nipplewort, AF, Eura
Matricaria maritima (*Tripleurospermum perforata*, *T. inodorum*, *T. maritima*, *M. perforata*), Scentless chamomile, PF, Euro
Matricaria parthenium (*Tanacetum parthenium*, *Chrysanthemum parthenium*), Feverfew, PF, Euro
Matricaria recutita (*M. chamomila*), Chamomile, AF, Euro
Onopordum acanthium, Scotch-thistle, PF, Eura, **UT-Nox**
Rudbeckia hirta, Black-eyed susan, PF, ENAm
Rudbeckia triloba, Brown-eyed susan, PF, ENAm
Senecio vulgaris, Common groundsel, AF, Euro
Solidago altissima ssp. *altissima*, Late goldenrod, PF, ENAm, Reported in FNA (2006)
Sonchus arvensis, Field sow-thistle, PF, Euro
Sonchus asper, Spiny-leaf sow-thistle, AF, Euro
Sonchus oleraceus, Common sow-thistle, AF, Euro
Sonchus uliginosus, Marsh sow-thistle, PF, Euro
Tanacetum balsamita (*Balsamita major*, *Chrysanthemum balsamita*), Costmary, PF, Eura
Tanacetum vulgare, Common tansy, PF, Euro
Taraxacum laevigatum (*T. erythrospermum*), Red-seed dandelion, PF, Eura
Taraxacum officinale, Common dandelion, PF, Eura
Tragopogon dubius, Yellow salsify, PF, Euro
Tragopogon porrifolius, Salsify, PF, Euro
Tragopogon pratensis (*T. lamottei*), Meadow salsify, PF, Euro
Vernonia marginata, Plains ironweed, PF, CNAm
Xanthium spinosum (*Acanthoxanthium spinosum*), Spiny cocklebur, AF, SAM
Zinnia acerosa, Shrubby zinnia, S, WNAm
- Convolvulaceae
- Convolvulus arvensis*, Field bindweed, PF, Eura, **UT-Nox**
Ipomoea purpurea, Morning glory, AF, TropAm
- Crassulaceae
- Sedum album*, White stonecrop, PF, Eura
- Cruciferae (Brassicaceae)
- Alliaria petiolata*, Garlic mustard, AF, Eura, **Co-Nox** (Salt)
Alyssum alyssoides, Pale madwort, AF, Euro
Alyssum desertorum, Desert madwort, AF, Euro
Alyssum minus var. *micranthum* (*A. parviflorum*, *A. simplex*), European madwort, AF, Eura
Alyssum murale, Yellow tuft, PF, Euro, Rep in Intermountain Flora (2005)
Alyssum szowitsianum, Szowits' madwort, AF, Euro
Arabidopsis thaliana, Mouse-ear cress, AF, Euro
Armoracia rusticiana, Horse-radish, PF, Eura
Barbarea vulgaris, European wintercress, PF, Eura
Berteroa incana, Hoary alyssum, AF, Euro
Brassica campestris (*B. napus*, *B. rapa*), Field mustard, AF, Euro
Brassica juncea, Indian mustard, AF, Asia
Brassica kaber (*Sinapis arvensis*), Charlock, AF, Euro
Brassica nigra (*Sinapis nigra*), Black-mustard, AF, Euro
Brassica tournefortii, Sahara mustard, AF, Med
Camelina microcarpa, Little-pod false flax, AF, Asia
Capsella bursa-pastoris, Shepherd's-purse, AF, Euro
Cardaria chalapensis (*C. draba* var. *Repens*), Orbicular whitetop, PF, Euro
Cardaria draba (*Lepidium draba*), Whitetop, PF, Euro, **UT-Nox**
Cardaria pubescens, Hairy whitetop, PF, Euro
Chorispora tenella, Blue mustard, AF, Asia
Conringia orientalis, Hare's-ear mustard, AF, Euro
Descurainia sophia, Flixweed, AF, Euro
Diploxaxis muralis, Sand rocket, AF, Euro
Draba nemorosa, Woodland whitlow-grass, AF, Eura
Draba verna, Spring whitlow-grass, AF, Asia
Eruca vesicaria, Garden rocket, AF, Euro
Erucastrum gallicum, Dog mustard, AF, Eura
Erysimum repandum, Spreading wall-flower, AF, Euro
Euclidium syriacum, Syrian mustard, AF, Euro
Hesperis matronalis, Dame's rocket, PF, Euro
Isatis tinctoria, Dyer's-woad, PF, Euro, **UT-Nox**
Lepidium campestre (*Neolepia campestre*), Field pepperwort, AF, Asia
Lepidium latifolium (*Cardaria latifolia*), Broad-leaf pepperwort, PF, Eura, **UT-Nox**
Lepidium perfoliatum, Clasping pepperwort, AF, Euro
Lepidium strictum, Upright pepperwort, AF, SAM

Lobularia maritima, Sweet alyssum, AF, Med
Malcolmia africana, African mustard, AF, Afr
Nasturtium officinale (*Rorippa nasturtium-aquaticum*), Watercress, PF, Euro
Rorippa austriaca, Austrian fieldcress, PF, Euro
Rorippa sylvestris, Shore yellowcress, PF, Euro
Sisymbrium altissimum, Tumble mustard, AF, Euro
Sisymbrium irio, London mustard, AF, Euro
Sisymbrium loeselii, False London rocket, AF, Euro
Thlaspi arvense, Field pennycress, AF, Euro

Cucurbitaceae

Bryonia alba, White bryony, PF, Euro
Citrullus lanatus, Watermelon, AF, Afr
Cucumis sativus, Cucumber, AF, Asia
Cucurbita palmate, Coyote gourd, PF, WNAm
Echinocystis lobata, Wild cucumber, AF, ENAm

Cuscutaceae

Cuscuta approximata var. *urceolata* (*C. epithymum* ssp. *approximata*), Slender dodder, PF, Med

Dipsacaceae

Dipsacus sylvestris (*D. fullonum* var. *sylvestris*), Teasel, PF, Euro
Knautia arvensis, Bluebuttons, PF, Euro

Ebenaceae

Diospyros virginiana, Common persimmon, T, ENAm

Elaeagnaceae

Elaeagnus angustifolia, Russian-olive, T, Euro, **Co-Nox** (Carb, Duch, Sevi, Uint, Wayn)

Euphorbiaceae

Chamaesyce hyssopifolia (*Euphorbia hyssopifolia*), Hyssop spurge, AF, ENAm
Chamaesyce maculata (*C. nutans*, *Euphorbia maculata*), Spotted spurge, AF, ENAm
Chamaesyce prostrata (*Euphorbia prostrata*, *E. chamaesyce*), Prostrate spurge, AF, ENAm
Euphorbia cyathophora, Fire-on-the-mountain, AF, ENAm
Euphorbia cyparissias (*Tithymalus cyparissias*), Cypress spurge, PF, Euro
Euphorbia dentata (*E. davidii*, *Poinsettia dentata*), Toothed spurge, AF, CNAm
Euphorbia esula (*Tithymalus esula*), Leafy spurge, PF, Euro, **UT-Nox**
Euphorbia marginata (*Agaloma marginata*), Snow-on-the-mountain, AF, CNAm
Euphorbia myrsinites (*Tithymalus myrsinites*), Myrtle spurge, PF, Euro, **Co-Nox** (Salt)
Euphorbia peplus (*Tithymalus peplus*), Petty spurge, AF, Euro

Frankeniaceae

Frankenia pulverulenta, Wisp-weed, AF, Euro

Fumariaceae

Fumaria officinalis, Drug fumitory, AF, Euro

Geraniaceae

Erodium cicutarium, Stork's-bill, AF, Euro
Geranium pusillum, Slender crane's-bill, AF, Euro

Gramineae (Poaceae)

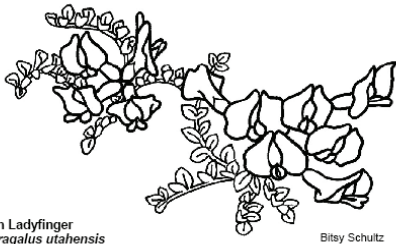
Aegilops cylindrica (*Cylindropyrum cylindricum*), Jointed goatgrass, AG, Euro, **Co-Nox** (SanJ)
Agropyron cristatum (*A. pectinatum*, *A. sibiricum*, *A. fragile*, *A. mongolicum*, *A. desertorum*), Crested wheatgrass, PG, Euro
Agrostis capillaris (*A. tenuis*), Colonial bentgrass, PG, Euro
Agrostis stolonifera (*A. alba*, *A. gigantea*), Redtop, PG, Euro
Alopecurus geniculatus, Marsh foxtail, PG, Euro
Alopecurus pratensis, Meadow foxtail, PG, Euro
Alopecurus ventricosus (*A. arundinaceus*), Creeping foxtail, PG, Euro
Apera interrupta, Italian sandgrass, AG, Euro
Arrhenatherum elatius, Tall oat-grass, PG, Euro
Arundo donax, Giant reed, PG, Euro
Avena fatua var. *fatua*, Wild oats, AG, Euro
Avena fatua var. *sativa* (*A. sativa*), Oats, AG, Euro
Bothriochloa ischaemum, Yellow bluestem, PG, Euro
Bromus briziformis, Rattlesnake chess, AG, Euro
Bromus catharticus (*B. willdenowii*), Rescue grass, AG, Euro
Bromus diandrus (*B. rigidus*, *Anisantha diandra*), Ripgut brome, AG, Euro
Bromus hordeaceus (*B. mollis*, *B. racemosus*), Soft chess, AG, Euro
Bromus inermis var. *inermis* (*Bromopsis inermis*), Smooth brome, PG, Euro
Bromus japonicus (*B. arvensis*), Japanese brome, AG, Euro
Bromus rubens, Red brome, AG, Euro
Bromus secalinus, Rye chess, AG, Euro
Bromus sterilis (*Anisantha sterilis*), Poverty brome, AG, Euro
Bromus tectorum (*Anisantha tectorum*), Cheatgrass, AG, Euro
Bromus trinii (*B. berteroi*), Chilean chess, AG, SAm
Buchloe dactyloides, Buffalo grass, PG, CNAm
Chloris verticillata, Tumble windmillgrass, PG, WNAm
Crypsis alopecuroides, Prickle-grass, AG, Euro
Crypsis schoenoides, Common prickle-grass, AG, Euro
Cynodon dactylon, Bermuda grass, PG, Afr, **UT-Nox** (except Wash Co)
Dactylis glomerata, Orchard grass, PG, Euro
Digitaria ischaemum, Smooth crabgrass, AG, Euro
Digitaria sanguinalis, Hairy crabgrass, AG, Euro
Echinochloa colona, Awnless barnyard-grass, AG, W
Echinochloa crus-galli, Barnyard-grass, AG, Euro
Eleusine indica, Goosegrass, AG, TropAs

Elymus elongatus (*Agropyron elongatum*, *Thinopyrum ponticum*), Tall wheatgrass, PG, Euro
Elymus hispidus (*Agropyron intermedium*, *Elytrigia intermedia*, *Thinopyrum intermedium*), Intermediate wheatgrass, PG, Euro
Elymus junceus (*Psathyrostachys juncea*), Russian wildrye, PG, Rus
Elymus repens (*Agropyron repens*, *Elytrigia repens*), Quackgrass, PG, Euro, **UT-Nox**
Eragrostis barrelieri, Mediterranean lovegrass, AG, Med
Eragrostis cilianensis, Stinkgrass, AG, Euro
Eragrostis curvula, Weeping lovegrass, PG, Afr
Eragrostis lehmanniana, Lehmann's lovegrass, PG, Afr
Eragrostis mexicana (*E. orcuttiana*), Mexican lovegrass, AG, WNAm
Eragrostis minor, Little lovegrass, AG, Euro
Eremopyrum triticeum (*Agropyron triticeum*), Annual wheatgrass, AG, Asia
Eriochloa contracta, Prairie cup-grass, AG, CNAm
Festuca arundinacea (*Schedonorus phoenix*, *S. arundinaceus*, *Lolium arundinaceum*), Tall fescue, PG, Euro
Festuca bromoides (*Vulpia bromoides*), Brome six-weeks fescue, AG, Euro
Festuca myuros (*Vulpia myuros*), Foxtail fescue, AG, Euro
Festuca pratensis (*Schedonorus pratensis*, *Lolium pretense*), Meadow fescue, PG, Euro
Festuca rubra, Red fescue, PG, ENAm
Holcus lanatus, Common velvet-grass, PG, Euro
Hordeum marinum (*H. geniculatum*), Mediterranean barley, AG, Euro
Hordeum murinum (*H. leporinum*, *Critiesion glaucum*), Rabbit barley, AG, Euro
Lolium perenne, Perennial ryegrass, PG, Euro
Muhlenbergia schreberi, Nimblewill muhly, PG, ENAm
Oryzopsis miliacea (*Piptatherium miliaceum*), Smilo grass, PG, Med, Rep in In termountain Flora (1977)
Panicum antidotale, Blue panicgrass, PG, Asia
Panicum dichotomiflorum, Spreading panicgrass, AG, ENAm
Panicum flexile, Wiry panicgrass, AG, ENAm
Panicum miliaceum, Broomcorn panic-grass, AG, Asia
Phalaris canariensis, Canary grass, AG, Afr
Phleum pretense, Timothy, PG, Euro
Piptochaetium lasianthum, Speargrass, PG, SAm
Poa annua, Annual bluegrass, AG, Euro & WNAm
Poa bulbosa, Bulbous bluegrass, PG, Euro
Poa compressa, Canada bluegrass, PG, Euro
Poa trivialis, Roughstalked bluegrass, PG, Euro
Polypogon interruptus, Ditch polypogon, PG, OW
Polypogon monspeliensis, Rabbit-foot-grass, AG, Euro

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- Polypogon semiverticillatus* (*P. viridis*, *Agrostis semiverticillata*), Water polypogon, PG, Eura
- Puccinellia distans*, Weeping alkaligrass, PG, Eura
- Puccinellia fasciculata*, Torrey's alkaligrass, PG, Euro
- Saccharum ravennae* (*Erianthus ravennae*), Ravenna grass, PG, Eura
- Schismus arabicus*, Arabian grass, AG, Med
- Schismus barbatus*, Mediterranean grass, AG, Med
- Sclerochloa dura*, Hardgrass, AG, Eura
- Secale cereale*, Cultivated rye, AG, Eura
- Setaria glauca* (*S. pumila*, *Pennisetum glaucum*), Yellow bristlegrass, AG, Eura
- Setaria verticillata*, Bur bristlegrass, AG, Eura
- Setaria viridis*, Green bristlegrass, AG, Eura
- Sorghum bicolor*, Grain sorghum, PG, Eura
- Sorghum halepense*, Johnson-grass, PG, Eura, **UT-Nox**
- Taeniatherum caput-medusae*, Medusa-head, AG, Asia, **UT-Nox**
- Triticum aestivum*, Wheat, AG, Eura
- Ventenata dubia*, Ventenata, AG, Euro
- Guttiferae (Clusiaceae, Hypericaceae)
- Hypericum perforatum*, Klamath weed, PF, Euro, **Co-Nox** (BoxE)
- Haloragaceae
- Myriophyllum spicatum* (*M. exalbescens*), European milfoil, PF, Euro
- Hydrophyllaceae
- Nemophila maculata*, Fivespot, AF, WNAm
- Iridaceae
- Iris germanica*, Fleur-de-lis, PF, Euro
- Iris pseudacorus*, Yellow flag, PF, Euro
- Juglandaceae
- Juglans nigra*, Black walnut, T, ENAm
- Juncaceae
- Juncus compressus*, Compressed rush, PG, Euro
- Juncus gerardii*, Black grass, PG, Eura & ENAm
- Labiatae (Lamiaceae)
- Ajuga reptans*, Carpet-bugle, PF, Euro
- Dracocephalum thymiflorum* (*Moldavica thymiflora*), Thyme-leaf dragonhead, AF, Eura
- Glechoma hederacea*, Ground ivy, PF, Eura
- Lamium amplexicaule*, Dead-nettle, AF, Euro
- Lamium purpureum*, Purple dead-nettle, AF, Euro
- Leonurus cardiaca*, Motherwort, PF, Asia
- Marrubium vulgare*, Common horehound, PF, Eura
- Melissa officinalis*, Lemon balm, PF, Euro
- Mentha citrata*, Bergamot mint, PF, Euro
- Mentha piperita*, Peppermint, PF, Euro
- Molucella laevis*, Shellflower, AF, Asia
- Nepeta cataria*, Catnip, PF, Euro
- Salvia azurea*, Blue sage, PF, ENAm
- Salvia greggii*, Gregg sage, S, WNAm
- Salvia sclarea*, Clary sage, PF, Euro
- Salvia sylvestris* (*S. nemorosa*), Forest salvia, PF, Euro
- Satureja vulgaris* (*Clinopodium vulgare*), Savory, PF, Eura & ENAm
- Stachys byzantina*, Woolly betony, PF, Asia
- Teucrium chamaedrys*, Wall germander, PF, Euro
- Leguminosae (Fabaceae)
- Albizia julibrissin*, Silk-tree, T, Asia
- Alhagi maurorum*, Camel-thorn, PF, Asia, **Co-Nox** (SanJ)
- Amorpha fruticosa* var. *occidentalis*, False indigo, S, WNAm
- Anthyllis vulneraria*, Kidney vetch, PF, Eura
- Astragalus cicer*, Chickpea milkvetch, PF, Euro
- Astragalus falcatus*, Russian sickle milk vetch, PF, Euro
- Caesalpinia gilliesii*, Poinciana, S, SAM
- Caragana arborescens*, Siberian pea-tree, S, Rus
- Colutea arborescens*, Bladder-senna, S, Euro
- Coronilla varia* (*Securigera varia*), Crown-vetch, PF, Euro
- Cytisus scoparius*, Scots broom, S, Euro
- Desmanthus illinoensis*, Illinois mimosa, PF, ENAm
- Galega officinalis*, Goatsrue, PF, Euro, **Co-Nox** (Cach)
- Gleditsia triacanthos*, Honey locust, T, ENAm
- Glycyrrhiza glabra*, Licorice, PF, Euro
- Halimodendron halodendron*, Salt-tree, S, Asia
- Lathyrus latifolius*, Perennial sweetpea, PF, Euro
- Lathyrus sylvestris*, Scots' sweetpea, PF, Euro
- Lotus corniculatus*, Bird's-foot-trefoil, PF, Euro
- Lotus tenuis* (*L. glaber*), Slender bird's-foot trefoil, PF, Euro
- Medicago falcata* (*M. sativa* var. *falcata*), Yellow alfalfa, PF, Eura
- Medicago lupulina*, Black medick, AF, Euro
- Medicago sativa*, Alfalfa, PF, Euro
- Melilotus alba*, White sweet-clover, AF, Euro
- Melilotus indica*, Indian sour-clover, AF, Eura
- Melilotus officinalis*, Yellow sweet-clover, PF, Euro
- Onobrychis vicifolia*, Sainfoin, PF, Euro
- Oxytropis riparia*, Riparian locoweed, PF, Asia
- Parkinsonia aculeata*, Jerusalem-thorn, T, WNAm
- Robinia pseudoacacia*, Black locust, T, ENAm
- Senna artemisioides*, Sage cassia, S, Aust
- Sphaerophysa salsula* (*Swainsonia salsula*), Red bladder-vetch, PF, Asia
- Trifolium fragiferum*, Strawberry clover, PF, Euro
- Trifolium hybridum*, Alsike clover, PF, Euro
- Trifolium pratense*, Red clover, PF, Euro
- Trifolium repens*, White clover, PF, Euro
- Trigonella corniculata*, Horned trigonella, AF, Euro
- Vicia villosa* var. *villosa*, Hairy vetch, AF, Euro
- Liliaceae
- Asparagus officinalis*, Asparagus, PF, Eura
- Hemerocallis fulva*, Orange day-lily, PF, Eura
- Hyacinthus orientalis*, Common hyacinth, PF, Asia
- Muscari botryoides*, Grape hyacinth, PF, Euro
- Ornithogalum umbellatum*, Star of Bethlehem, PF, Euro
- Linaceae
- Linum grandiflorum*, Flowering flax, AF, Afr
- Lythraceae
- Lythrum salicaria*, Purple loosestrife, PF, Euro, **UT-Nox**
- Lythrum tribracteatum*, Three-bract loosestrife, AF, Eura
- Malvaceae
- Abutilon theophrasti*, Velvetleaf, AF, Euro, **Co-Nox** (SanP)
- Althaea rosea* (*Alcea rosea*), Hollyhock, PF, Asia
- Hibiscus trionum*, Flower-of-an-hour, AF, Afr
- Malva neglecta*, Common mallow, AF, Eura
- Malva parviflora*, Small-flower mallow, AF, Euro
- Malva sylvestris*, High mallow, PF, Euro
- Malva verticillata* (*M. crispa*), Curled mallow, AF, Eura
- Meliaceae
- Melia azedarach*, Chinaberry, T, Asia
- Moraceae
- Fatoua villosa*, Hairy crabweed, AF, Asia
- Morus alba*, White mulberry, T, Asia
- Nyctaginaceae
- Mirabilis nyctaginea* (*Oxybaphus nyctagineus*, *O. comatus*), Heart-leaf four-o'clock, PF, CNAm
- Nymphaeaceae
- Nymphaea odorata*, Fragrant water-lily, PF, ENAm
- Oleaceae
- Fraxinus pensylvanica*, Green ash, T, ENAm
- Onagraceae
- Oenothera speciosa*, Nuttall's evening-primrose, PF, CNAm
- Oxalidaceae
- Oxalis corniculata*, Creeping yellow wood-sorrel, PF, Euro
- Oxalis dillenii*, Southern yellow wood-sorrel, PF, ENAm
- Papaveraceae
- Argemone polyanthemus*, White prickly-poppy, PF, CNAm, Rep in FNA (1997)
- Eschscholzia californica*, California poppy, AF, WNAm
- Papaver glaucum*, Tulip poppy, AF, Asia
- Papaver rhoeas*, Corn poppy, AF, Eura
- Roemeria refracta*, Asian poppy, AF, Eura
- Pinaceae
- Larix occidentalis*, Western larch, T, WNAm
- Plantaginaceae
- Plantago lanceolata*, English plantain, PF, Eura
- Plantago major*, Common plantain, PF, Euro (some strains may be native)

- Polemoniaceae
Gilia capitata, Ornamental gilia, AF, WNAm
- Polygonaceae
Polygonum argyrocolen (included in *P. ramosissimum* in Utah Flora 2003), Persian knotweed, AF, Asia, Rep in FNA (2005)
Polygonum aubertii (*Fallopia aubertii*, *F. baldschuanica*), Silver lace-vine, PF, Asia
Polygonum aviculare (*P. arenastrum*), Yard knotweed, AF, Eura
Polygonum convolvulus (*Fallopia convolvulus*), Black-bindweed, AF, Euro
Polygonum cuspidatus (*Reynoutria japonica*, *Fallopia japonica*), Fleece knotweed, PF, Asia
Polygonum hydropiper (*Persicaria hydropiper*), Water-pepper, AF, Euro
Polygonum lapathifolium (*Persicaria lapathifolia*), Willow-weed, AF, Eura
Polygonum persicaria (*Persicaria maculosa*), Lady's-thumb, AF, Eura
Rumex acetosella (*Acetosella vulgaris*), Sheep sorrel, PF, Eura
Rumex crispus, Curly dock, PF, Eura
Rumex dentatus, Dentate dock, PF, Asia
Rumex obtusifolius, Bitter dock, PF, Eura
Rumex patientia, Patience dock, PF, Eura
Rumex stenophyllus, Narrow-leaved dock, PF, Eura
- Portulacaceae
Portulaca oleracea, Common purslane, AF, ENAm
- Potamogetonaceae
Potamogeton crispus, Crisped pondweed, PF, Euro
- Primulaceae
Anagallis arvensis, Scarlet pimpernel, AF, Euro
- Punicaceae
Punica granatum, Pomegranate, T, Asia
- Ranunculaceae
Adonis aestivalis, Pheasant-eye, AF, Eura
Clematis orientalis (*Viticella orientalis*), Oriental clematis, PF, Asia
Delphinium ajacis (*Consoldia ajacis*), Rocket larkspur, AF, Euro
Ranunculus acris var. *acris*, Tall buttercup, PF, Eura
Ranunculus arvensis, Field buttercup, AF, Euro
Ranunculus repens var. *pleniflorus* Creeping buttercup, PF, Eura
Ranunculus repens var. *repens*, Creeping buttercup, PF, Eura
Ranunculus testiculatus (*Ceratocephala orthoceras*, *C. testiculata*), Bur buttercup, AF, Eura
- Rhamnaceae
Rhamnus cathartica, Common buckthorn, S, Eura
Ziziphus jujuba, Jujube, S, Eura
- Rosaceae
Crataegus chrysoarpa (*C. columbiana* var. *chrysoarpa*, *C. rotundifolia*), Yellow hawthorn, S, CNAm
Geum urbanum, City avens, PF, Eura
Malus pumila (*Pyrus malus*), Common apple, T, Eura
Potentilla norvegica, Norwegian cinquefoil, AF, Euro
- Prunus americana*, American plum, S, CNAm
Prunus besseyi, Western sand cherry, S, CNAm
Prunus persica, Peach, T, Asia
Prunus serotina, Wild black cherry, T, ENAm
Prunus tomentosa, Bush cherry, S, Asia
Pyracantha coccinea, Fire-thorn, S, Eura
Pyrus calleryana, Callery's pear, T, Asia
Pyrus communis, Common pear, T, Eura
Rosa canina, Dog rose, S, Euro
Rosa egalantaria (*R. rubiginosa*), Sweet-briar, S, Euro
Rosa multiflora, Multiflora rose, S, Asia
Rubus discolor (*R. armeniacus*), Himalayan blackberry, S, Eura
Sanguisorba minor, Garden burnet, PF, Euro
Sorbus aucuparia, European mountain-ash, T, Euro
- Rubiaceae
Galium mollugo, Great hedge bedstraw, PF, Med, Rep in Intermountain Flora (1984)
Rubia tinctorum, Madder, PF, Euro
- Salicaceae
Populus alba, White poplar, T, Eura
Salix fragilis, Crack willow, T, Eura
- Sapindaceae
Koelreuteria paniculata, Golden rain-tree, T, Asia
- Saxifragaceae
Darmera peltata, Umbrella plant, PF, WNAm
- Scrophulariaceae
Leucophyllum frutescens, Leucophyllum, S, WNAm
Linaria canadensis (*Nuttallanthus texanus*), Blue toadflax, AF, ENAm
Linaria dalmatica (*L. genistifolia* ssp. *dalmatica*), Dalmatian toadflax, PF, Euro, **Co-Nox** (Salt, Wasa)
Linaria vulgaris, Butter-and-eggs, PF, Eura, **Co-Nox** (Wasa)
Penstemon venustus, Shrubby penstemon, PF, WNAm
Verbascum blattaria, Moth mullein, PF, Euro
Verbascum thapsus, Woolly mullein, PF, Eura
Verbascum virgatum, Wand mullein, PF, Euro
Veronica anagallis-aquatica, Water speedwell, PF, Euro
Veronica arvensis, Corn speedwell, AF, Eura
Veronica biloba (*Pocilla biloba*), Two-lobed speedwell, AF, Asia
Veronica hederifolia, Ivy-leaved Speedwell, AF, Euro
Veronica persica (*Pocilla polita*), Bird-eye speedwell, AF, Eura
- Simaroubaceae
Ailanthus altissima, Tree-of-heaven, T, Asia
- Solanaceae
Datura stramonium, Jimson weed, AF, TropAm
Hyoscyamus niger, Black henbane, AF, Euro, **Co-Nox** (Rich, SanP)
Lycium barbarum, Matrimony-vine, S, Eura
- Physalis heterophylla*, Clammy ground-cherry, PF, ENAm
Physalis hispida, Hispid ground-cherry, PF, CNAm, Rep in Intermtn Flora (1984)
Physalis pubescens, Pubescent ground-cherry, AF, ENAm
Physalis virginiana, Virginia ground-cherry, PF, ENAm, Rep in Intermountain Flora (1984)
Solanum carolinense, Carolina nightshade, PF, ENAm
Solanum dulcamara, European Bittersweet, PF, Eura
Solanum elaeagnifolium, Silverleaf nightshade, PF, CNAm, **CoNox** (SanJ)
Solanum nigrum, Black nightshade, AF, Euro
Solanum rostratum, Buffalobur, AF, CNAm, **Co-Nox** (Mill, SanJ)
Solanum sarrachoides (*S. villosum*, *S. physalifolium* var. *nitidibaccatum*), Ground-cherry nightshade, AF, SAM
- Tamaricaceae
Tamarix chinensis (*T. pentandra*, *T. ramosissima*), Five-stamen tamarisk, S, Eura, **Co-Nox** (Uint)
Tamarix parviflora (*T. tetrandra*), Small-flowered tamarisk, S, Euro
- Ulmaceae
Ulmus pumila, Siberian elm, T, Asia
- Umbelliferae (Apiaceae)
Apium graveolens, Celery, PF, Eura, Rep in Intermtn Flora (1997)
Carum carvi, Caraway, PF, Eura
Conium maculatum, Poison-hemlock, PF, Eura, **Co-Nox** (Cach, Davi, Kane)
Daucus carota, Queen Anne's lace, PF, Eura
Foeniculum vulgare, Sweet fennel, PF, Euro
Pastinaca sativa, Common parsnip, PF, Euro
Torilis arvensis, Field hedge-parsley, AF, Euro
- Valerianaceae
Centranthus ruber, Centranthus, AF, Euro
Valerianaella locusta, Valerianella, AF, Euro
- Verbenaceae
Lantana camara, Lantana, S, SAM
Lantana montevidensis, Trailing lantana, S, SAM
Phyla nodiflora, Matted fog-fruit, PF, WNAm
Verbena rigida, Tuber vervain, PF, SAM
Verbena tenuisecta, South American vervain, PF, SAM
- Violaceae
Viola arvensis, Field pansy, AF, Euro
Viola odorata, English violet, PF, Euro
Viola papilionacea (*V. sororia*), Meadow violet, PF, ENAm
Viola tricolor, Pansy, AF, Eura
- Vitaceae
Parthenocissus quinquefolia, Virginia creeper, S., ENAm
- Zygophyllaceae
Tribulus terrestris, Puncture vine, AF, Eura, **Co-Nox** (Cach, Webe)



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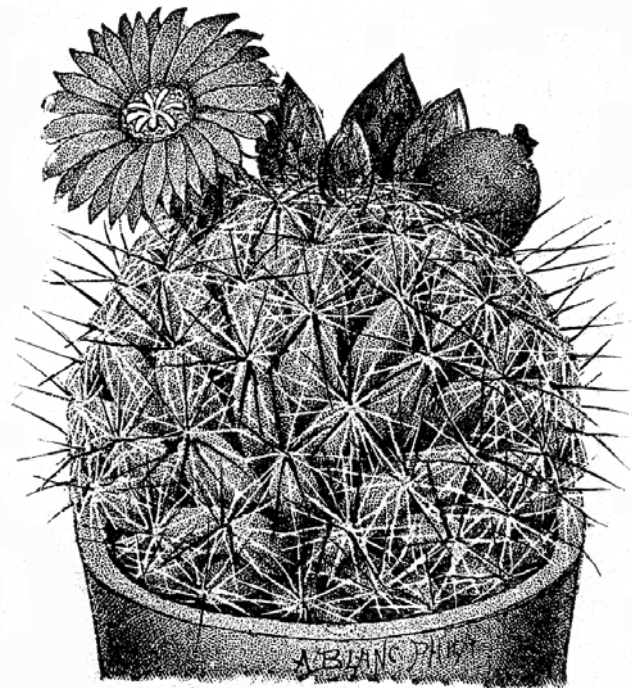
Exploitation of Utah Cacti Began Early

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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Sego Lily Editor: Walter Fertig (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 4th 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 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 Landscaping that put in

the retaining walls and walks.

Susan Meyer, Bitsy Schultz, Tamara Bahr, Denise VanKeuren, 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 INPGA 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.—
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 20th 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 Kjellgren, 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), 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.

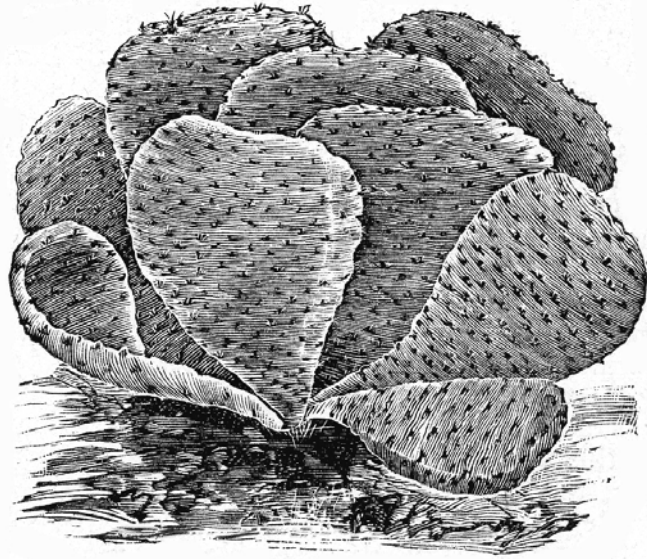
*See "USFWS to investigate status of rare Uinta Basin sclerocacti" in the January, 2007 *Sego Lily* (vol 30, # 1, pp 10-11).

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

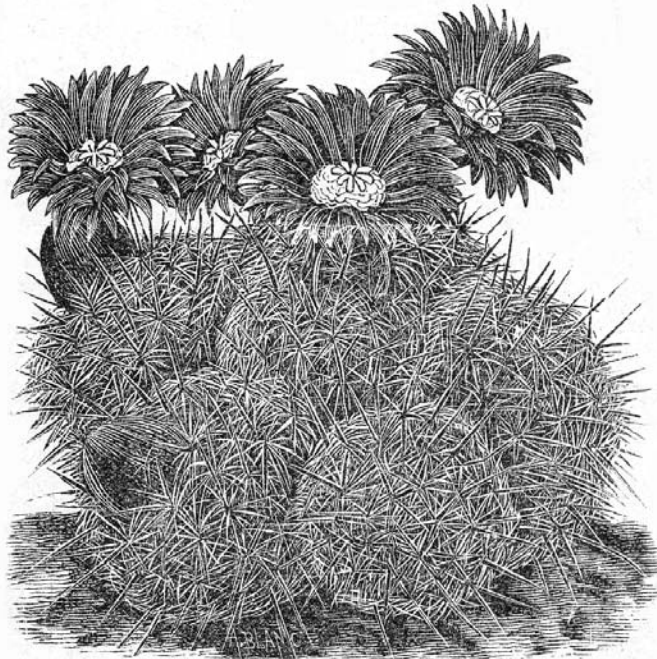
trade or sell seeds around and grow their own. Interstate and international trade in seeds is carefully regulated by CITES, but some countries pay meticulous attention to CITES and some do not.

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 20th 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), 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



Sulfur cinquefoil
illustration by
Walter Fertig

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*

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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.

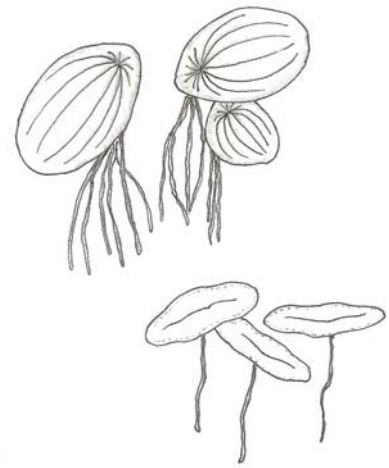
Most duckweeds retain simple roots for mineral absorption, though they no longer need them for anchorage. Actually, the presence or absence of roots and their

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

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



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