



Segoe Lily

Newsletter of the Utah Native Plant Society

March 2012 (volume 35 number 2)

Wildflower Photography Techniques: Macrophotography

Text and Photos by Steve Hegji



In this issue:

Wildflower Photography Techniques: Macro-photography	1, 5
Chapter News	2
Bulletin Board	3
Utah Valley Chapter Supports Budding Botanists	4
Opening the Region's Herbaria .	6
Utah <i>Opuntia</i> Treatment in Progress	9
Twig Talk: The Fun of Winter Botany	10
Unidentified Flowering Object	12

Cover: *Olsynium douglasii* (*Sisyrinchium douglasii*) by Steve Hegji. Also known as Purple-eyed grass, this member of the Iris family is extremely rare in Utah, known from just one location in Tooele County. *O. douglasii* differs from other blue-eyed grasses in having much larger, rose-purple flowers and stamen filaments joined only near the base.

"Many a small thing has been made large by the right kind of advertising" Mark Twain.

"To me, macrophotography, sometimes also referred to as close-up photography, is magical because it takes us into a smaller universe of vibrant colors, exquisite details and extraordinary patterns that can literally take your breath away. This is especially the case when doing macrophotography of wildflowers which provide an incredible variety of shapes and colors that could potentially keep a photographer engaged for a lifetime." David J. Gubernick, Rainbow Spirit Photography.

[continued on page 5]

Utah Native Plant Society



Utah Native Plant Society

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Website: For late-breaking news, the UNPS store, the *Sego Lily* archives, Chapter events, sources of native plants, 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 (801-582-0432) or Susan Fitts (801-756-6177), 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). The deadline for the May 2012 *Sego Lily* is 15 April 2012.

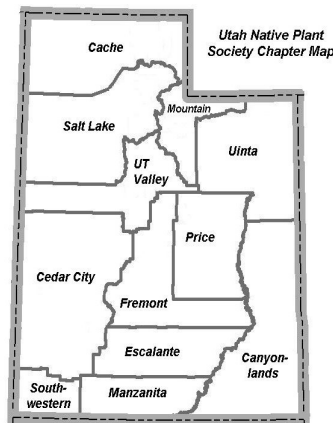
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Chapter News

Cache: The annual Richard J. Shaw Memorial Wildflower Walk will take place on Tuesday, June 5, at 6:30 PM. Meet at the upper end of the parking lot in Green Canyon. On June 23, our Alterniscapes Garden Tour of private gardens in the Logan and River Heights areas and on the Utah State University campus will take place. See the Cache Chapter Facebook page or call 435-797-0061 for more information.—*Michael Piep*

Manzanita (Kane County): At our February meeting, retired pharmaceutical researcher Steve Dahl gave an illustrated history of human use of medicinal herbs and the recent controversies over whether over-the-counter herbal supplements actually provide proven medical benefits (the results were a surprise). On Tuesday, March 20, I will give a presentation on the wildflowers of Zion NP at 7 PM at the Southwest Applied Technology College in Kanab.—*W. Fertig*



Salt Lake Chapter: In January, Ty Harrison spoke to a packed audience about his family's long tradition of harvesting native fruits to make jams and jellies (samples were included as part of the program). Blake Wellard and a fellow graduate student put us in touch with new research into the classic hybrid oaks studied by Walter Cotnam at our February meeting.

Our upcoming meetings: Wednesday, March 7, at our usual REI location, Sage Fitch of the Salt Lake County Weed Control program

will update our members on the current state of noxious weeds in the area. On Tuesday, April 3, Joel Tuhy of The Nature Conservancy's Moab office will give a presentation about "Large Families" - in this case some of the native plants that grow in the Canyonlands region. Note that this is a Tuesday and will NOT be at REI: contact me (801-532-3486) closer to the date to learn about location and time.—*Bill Gray*

Southwest Chapter (Washington Co.): The chapter held its 4th tree pruning workshop on February 18th. Special thanks to Val and Greg who shared their trees in Virgin and to Rick Hefelbower for his lively, hands-on experience. On Monday, March 19, Steve Dahl will speak on "Medicinal use of plants: Poppies to Pomegranates", focusing on the history of botanical pharmacy and the evidence for (and against) the utility of herbal supplements. Walt Fertig will talk about the wildflowers of Zion for our April 23 meeting. All meetings are at the public library in Springdale. - *Barbara Farnsworth*

Bulletin Board

2012 Rare plant meeting, March 6: Red Butte Garden and the Utah Native Plant Society are once again sponsoring the annual Utah Rare Plant meeting, on Tuesday, March 6 at Red Butte Garden (300 Wakara Way, Salt Lake City). The meeting is scheduled from 9AM to 4:30 PM, with registration beginning at 8:30 AM. Among the items on the agenda are reports on the habitat and reproductive ecology of *Hesperidanthus suffrutescens*, population genetics of the Utah shooting star, impacts of dust on rare species, an update on *Opuntia basilaris* var. *heilii*, and using herbarium data to monitor long term effects of climate change, and many other research and policy updates. Registration for the meeting is \$15 and includes a boxed lunch (but this is only guaranteed for those registering in advance through the Red Butte Garden website at http://www.redbuttegarden.org/conservation_research).

Winter and Spring Workshops at the Intermountain Herbarium: The following workshops will be held this year at the Intermountain Herbarium of Utah State University in Logan. For more details, consult the Intermountain Herbarium website, Intermountain Herbarium Facebook page, UNPS-Cache Chapter Facebook page, or Bridgerland Mushroom Society Facebook page, or call 435-797-0061. **March 16-17:** Grasses I: An introduction to grass identification. Learn the structure of grasses and major tribes, A follow-up workshop (Grasses II) will take place in late summer/fall. **May 18-19:** Introduction to Mushroom Identification. Demystify mushrooms and participate in a 1 day mushroom foray. **June 2 and 9:** Plant Identification, an Introduction: Learn basic structure and terminology over two Saturday sessions, Second Saturday will be spent outdoors in a local canyon. - *Michael Piep*

Herbarium Night at Utah Valley University, March 22: The UVU Herbarium is sponsoring another series of volunteer days for mounting their backlog of plant specimens. The herbarium will also be hosting a Utah Valley Chapter meeting toward the end of the volunteer session. Plant mounting will take place in the Herbarium, room 109 in the Pope Science Building and run from 4 PM until 7 PM and the meeting will start around 6 PM. For most meetings, I will be giving a plant workshop-style presentation on a group of hard-to-identify local plants. Other special meetings are being planned with an invited speaker. The Sorenson Visitor Lot (behind the Student Center near the wolverine statue), the Lakeside Visitor Lot (at the south entrance past the traffic circle off University Avenue), and the UCCU Visitor Lot (next to the events center) are recommended parking locations. These are toll booth visitor lots. Four-hour parking validations will be provided to attendees. If the parking situation changes due to construction issues, an announcement will be made via email. For further information, please call me (801-863-6806) or email (alexanja@uvu.edu) - *Jason Alexander*

UNPS Scholarship Program: Applications are being accepted for the 2012 UNPS student research scholarship through April 1. The scholarship program is open to any college student pursuing research on the botany or ecology of Utah, including research on native or non-native species and their habitats. Refer to the UNPS website for the one-page application form (www.unps.org). Student applicants must also submit a 1-3 page proposal outlining the objectives and significance of their work, proposed methods, a brief budget summary, and names, addresses, and contact information for 2 personal references. For more information, contact Therese Meyer (theresebmeyer@gmail.com) or Walter Fertig (walt@kanab.net). UNPS also offers competitive grants for non-student projects through its grant-in-aid program; see the UNPS website for more details (search under "programs").

2012 Penstemon Festival Update: This year's *Penstemon* Festival has been moved back one week to the weekend of June 8-9. The festival, sponsored by Great Basin Natives, Wildland Nursery, and the Utah Native Plant Society, will be held at the County Fair building in Richfield, Utah starting at 1 PM on Friday, June 8. Among the highlights of the festival will be native plant vendors, field trips, and an evening social before guest speaker David Salman of High Country Gardens gives a presentation on *Penstemon* gardening (7 PM, June 8). Volunteers are needed to help with organization, cleanup, and field trips. Look for more details in the May Segoe Lily or contact Merrill Johnson (merrillester@gmail.com) or Janett Warner (janettwildland@gmail.com).

ZCFI Botany Classes in Southwest Utah: The Zion Canyon Field Institute (a subsidiary of the Zion Natural History Association) offers a wide array of field classes centered in Zion National Park and vicinity. This spring's botanical offerings include: Mojave Wildflowers (April 7), Lytle Preserve (birding, botanizing, and geology; April 13-14), Zion Low Desert Wildflowers (April 23), Native Plants and Xeriscaping (with Lisa White; April 28), Kolob Wildflowers (May 12), and Hanging Gardens of Zion (May 18). Unless otherwise mentioned, these classes are taught by your umbel editor, Walter Fertig. For more information and to register (there is a fee for the classes), go to the ZCFI website at www.zionpark.org/zcfi_schedule_new_2008.php or google Zion Canyon Field Institute. *Right: Pretty phacelia (Phacelia pulchella), one of Zion's low desert wildflowers by W. Fertig*



UNPS Chapter Highlights: Utah Valley Chapter Supports Budding Botanists

By Celeste Kennard

Since being founded by April Jensen and me in 2006, the “Plants and Preschoolers” program has sponsored dozens of hikes to many canyons and trails in Utah Canyon. Each year we first start out on different areas of the Shoreline Trail. Kids and adults love these trails for the great views of what used to be Lake Bonneville that covered the Great Basin. The trail follows the Bonneville Bench that marked the high water line in the Pleistocene about 15,500 years ago. The trail is often like a roller coaster leading you up and down but is generally 5000 feet from sea level and is clearly visible in most of the Wasatch Front.

One of our favorite things about these trails are the sego lilies that start showing up in May and can last into June in some of the more shady areas of the trail. The children definitely like the scrub oaks the best. The oak canopies are just the right height to admit a toddler but resist entry by adults (unless they are willing to crouch down to a child’s level). The groves host many treasures like acorns and small animals that skitter around. The oaks lead to many great topics like debating how many of the groves are made



Left: Brooke Jensen and Hanna Kennard enjoying flowers and sunshine, 2006. Bottom left: Wendy Jessop with son Kade and daughter Emery hiking among the cottonwoods and maples in Battle Creek Canyon. Photos by Celeste Kennard.

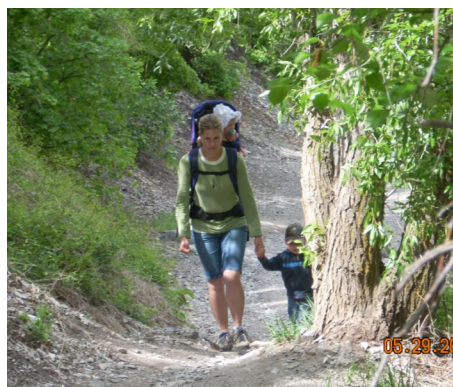
from a single specimen or if we might be able to locate some Cottam Hybrids.

As the summer heat presses down on us each year, we flee to the canyons and seek out streams and waterfalls. Up Payson Canyon we often hike over many small foot bridges before coming to the waterfall where we find Firecracker penstemons and other surprise plants. Kids tell us there are trolls at every bridge, but we never see any (although I am pretty sure we heard some Billy Goats Gruff tramping on those bridges). If you really want to cool off and see some riparian plants and stunning geology, do not miss Battle Creek Falls.

Autumn always requires a trip to the Wardsworth Trail up Hubble Creek Canyon. Here it is fun for children to lay out all the variations of color in the Big-tooth maple leaves: green, yellow, orange, red, and purple. Do not forget to rub the soft underside of the leaves on your child’s cheek or you might miss out on some cute giggles.

Nature is just waiting for you to come see, hear, taste, smell, and romp around. Come join us this year on our fun-filled hikes that are sure to help you understand what preschoolers and botanists have in common ... they are easily distracted by sights along the trail. We are not fast and we do not hike far, but we make up for it in fun and joy of discovery.

Plants and Preschoolers Hikes will continue in spring of 2012 with April Jensen and I leading the way. Our hikes often have older children and teenagers participating in the summer and we even do a couple of campouts. I am looking for someone that might be interested in taking my place in 2013 when my four children will all be of school age. I in turn plan to start a new group of hikers that like weekday mornings and to cover more distance. If you are interested, please call or email (801-377-5918; celestegk@gmail.com). Our first hike will be at Rock Canyon in Provo on Thursday, April 16, starting at the trailhead at 10 AM. See the UNPS website for directions to our favorite trails.



Wildflower Photography Techniques: Macrophotography

By Steve Hegji

[continued from page 1]

Macrophotography is challenging, but rewarding if you attempt it. I'll briefly cover a few issues here, but I suggest you brush up on my previous article in the May 2011 issue of *Sego Lily*; and I STRONGLY encourage you to read David J. Gubernick's complete Wildflower Macrophotography article at www.rainbowspirit.com.

I'm going to stick with my past opinion that the camera is not as important as the composition. Many of you have "point and shoot" cameras that can take close up pictures. I've seen some beautiful shots taken with these cameras. Those of you with more expensive, full-featured cameras probably already know how to achieve close up pictures. I will say that I use a lens that is "technically" a macro, but I don't consider it a "true macro" in that it is not capable of producing 1:1 ratio of object to image size on the camera sensor. Mine produces a 1:3 ratio, which is adequate.

Backgrounds

As you compose a close up picture, chances are that the background will be nicely out of focus – filling the frame with a wash of color. Try to position the shot so that the background is a complementary, darker color. This increases the contrast. For example, you would not compose a shot of a blue flower with the blue sky as background – although that would work great with something like a California Poppy.

Orientation in the Frame

You can and should tweak the composition of your photograph when you crop it on a computer,



Above: Balsamorhiza sagittata) in three-quarter profile. Note the details of the floral disk and hairy scales that are rarely seen in more conventional images. Photo by Steve Hegji.

but you'll derive a lot of satisfaction from getting it right in the field. A vertical arrangement is generally not as attractive as a diagonal arrangement. Downward facing flowers look a bit funny if they are below the center of the frame. Three-quarter profile shots of flowers can be more effective than "face on." Just be aware of these issues when you compose the shot – look for what you find pleasing.

Focusing

Frankly, the closer you get, the more difficult it is to obtain sharp focus on all areas of a flower that has some depth. But don't let the issue of sharpness affect the strength of the compo-

sition. Take a look at the picture of Purple-eyed grass (*Sisyrinchium douglasii* or *Olsynium douglasii*) on the cover. I think it's very nice, even though much of it is not in focus. Take several pictures, focusing on different areas, and choose what appeals to you. By the way – if you leave your camera on autofocus, you won't have any choice in the matter.

Up Close and Personal

Flowers like people, often really "pop" when they fill the frame. The photo above shows a three-quarter profile image of *Balsamorhiza sagittata*, I think it's a great example. So much beautiful detail to capture your attention - wherever in the frame you look!

Well, I may have simplified this topic a lot – but my intention was to encourage you to go out and give it a try. Keep at it until you get that first spectacular shot – you'll be hooked forever.

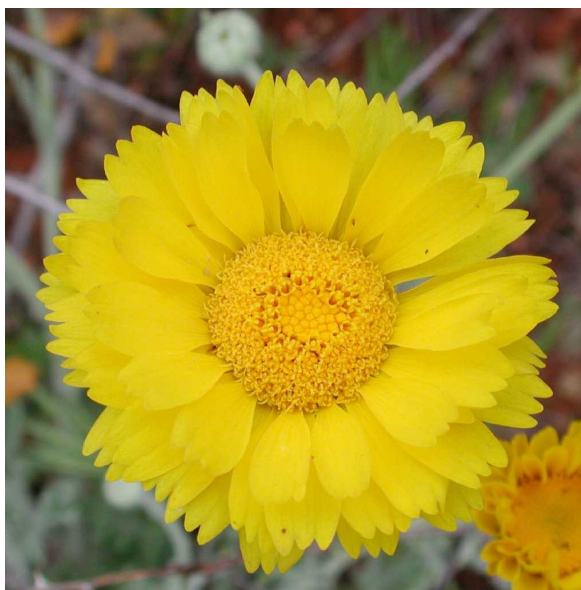
Opening the Region's Herbaria

By Mary Barkworth, Utah State University

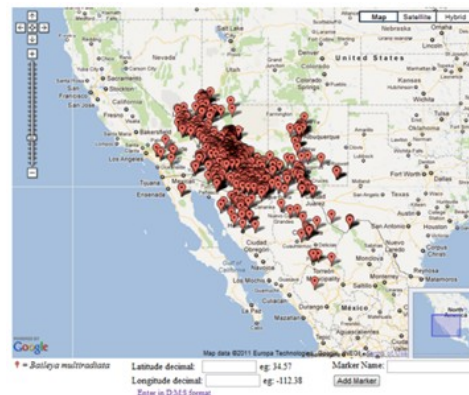
Want to know what grows where in the Intermountain Region? Check out <http://intermountainbiota.org>. It will help you find answers to that and other questions about plants in the Intermountain West (basically Utah, Nevada, and southern Idaho). The site currently brings together information from more than 30 herbaria, including five from the Intermountain Region (Table 1). Several other regional herbaria plan to contribute in the near future. The goal is to persuade all herbaria in the region to join, thereby enabling "one stop shopping" for documented information about plant distributions in the Intermountain Region.

What is possible - now?

Maps: You can search all or some of the collections for records of one or more species. Just click "Search collections" in the left column of the home page and follow the instructions. You will be presented with a list of all the specimens found that meet your criteria. You may then view the distribution of the georeferenced specimens (those for which the latitude and longitude is known) in Google® maps or Google Earth®, with different colored balloons for different species. Or you can download the information (so long as it is not for an endangered species) for use in the analysis of your choice by clicking on the icon at the top right of the specimen list. Clicking on any of the balloons will bring up the label information for that specimen. One warning: the maps can only show 1000 records. Most of the time that is not a problem but there are over 1000 georeferenced records of Indian



Above: *Desert marigold* (*Baileya multiradiata*) by Max Licher. Right: Range map of *Desert marigold* in the southwestern United States and northern Mexico based on digital specimen data available from regional herbaria.



ricegrass (*Achnatherum hymenoides*) in the central database.

You can also search for all the species in a particular area. Use the "Search collections" link again but, instead of specifying the name of a species, choose one or more of the other search criteria provided. You could, for instance, search for all records within your county, within a mile of your house, or within a box defined by its latitude and longitude. You can also search for all the collections by a particular person, for instance Marcus E. Jones.

Descriptive pages: Clicking a species name will bring up a descriptive page (Fig. 3). These pages provide a written description, thumbnail versions of the top-ranked images, and a map thumbnail. The descriptions come from various online sources such as the Flora of North America. The image thumbnails are linked to larger versions of the same image. To see all the images for a species, click on "More Photos" at the bottom of the page. Be aware that the map thumbnails show only a few of the available records. To see the actual distribution of the species, as reflected in the database, click on the thumbnail.

Dynamic features: What else can you do? Click on “Dynamic Checklist” in the left column of the home page, then click somewhere in the map that comes up. After a little while, you will see a list of 700-900 species found around the area. The area involved varies. For well-collected locations, it may be a circle with a 10 mile radius; for poorly collected locations (or locations for which the records have not yet been entered in the database), a radius of 80 or even 90 miles may be involved.

Prefer the names to be in English? Check “Common names” box on the checklist page and rebuild the list. Want to be reminded what the species look like? Choose “Display as images” and rebuild the list. For some species, you will see an attractive image of a living plant, for others an herbarium specimen, and for others an empty frame with the phrase “Image not available as yet”.

You can also test your ability to identify the species listed by clicking “Games” near the top of the page and choose the “Flash Card Quiz”. Or, by clicking the key icon next to “Games”, you can use the list as the starting point in attempting to identify a plant from the area.

Personal Checklists: If you would like to build an illustrated checklist of the species you see along a trail, on your property, for the school where you teach, or a nearby park, this too is possible. First you need to create an account, which you do by clicking on the “New account” option in the left column of the home page . Once you have an account, login, choose “My profile” and then go to the “Personal Checklists” tab. You can create a checklist by uploading a comma delimited file of names or by adding names one by one. You can choose to base your list on names in an existing check-

Table 1. Institutions with herbaria contributing vascular plant records to the Intermountain Region’s herbarium portal. “Regional” is the number of specimens from Idaho, Nevada, or Utah. “Total” includes all records made available through the site. Only herbaria contributing some regional specimens are shown.

Location	Institution	Regional	Total
AZ	Arizona State University	493	186,515
AZ	Museum of Northern Arizona	1091	26,228
AZ	Navajo Nation Herbarium	1771	11,271
AZ	Northern Arizona University (Deaver herbarium)	2,523	73,697
AZ	University of Arizona	1667	226,538
CA	University of California – Riverside	8,918	204,119
CO	Colorado State University	1,014	58,820
NM	San Juan College	10,627	60,060
NY	New York Botanical Garden	96,091	151,668
UT	Brigham Young University (Stanley L. Welsh Herbarium)	4,979	7,782
UT	Snow College	46	46
UT	Utah State University (Intermountain Herbarium)	55,266	107,512
UT	Utah State University - College of Eastern Utah	10	10
UT	Utah Valley University	11,728	12,990
WY	University of Wyoming (Rocky Mountain Herbarium)	29,461	656,366
	Total (December 20, 2011)	225,685	1,783,622

list – or start from scratch. Personal checklists, like those generated by searches, can be viewed with or without images and can serve as the basis of a flash card quiz or the starting point of an identification key.

Teachers can use the personal checklist file to help their students learn to recognize particular species, such as those that are found within one mile of the school ground or are of agricultural or therapeutic value. To make the checklist available to all students in a class, it must either be created with an account that all the students can use or be made publicly avail-

able as a “Teaching checklist” by sending a request to the system administrator. Again, once a checklist has been created, it can serve as the basis of a flash card game or the starting point for identifying an unknown species.

Warnings

The information provided by Intermountainbiota.org, particularly the specimen data, is limited by the resources herbaria have, or do not have, for digitizing (e.g., databasing, georeferencing, and imaging) their records. Table 1 shows the number of records in the database for the core states of the Intermountain Region on

December 20, 2011. The total is probably only 15% of the specimens that have been collected in the region. This means that checklists based on records in the database are unlikely to be complete. Herbaria in the region are working hard at making more records available but entering data and creating the necessary links takes time, and time costs money.

Similarly, the identification tools will not, as yet, work well in the Intermountain Region because there has been no organized effort to enter data for the region's species into the morphological database on which the tool depends. At present, the primary goal of the region's herbaria is to make their collection records available. There are some online identification keys for the region at <http://herbarium.usu.edu/IMRkeys/default.html> but most are simply interactive dichotomous keys and go only to family or genus.

Want to help build the regional portal?

The rate at which the Intermountain Biota portal develops depends primarily on the resources available to herbaria. These resources range from physical equipment (imaging equipment costs about \$5000), personnel time (for entering records, imaging the specimens, and georeferencing), and IT support (for setting up the connections and maintaining the central database). There are several ways in which UNPS members and chapters can assist. Obviously, one of the resources needed is money. Databasing one specimen costs, on average, about \$1.00. This is just databasing; it does not include preparing the specimen, imaging, and georeferencing. Most herbaria employ students for the task so a donation to the herbarium of your choice would be really

helpful. Herbaria also welcome the assistance of volunteers. We shall be holding some workshops this summer on data entry (for herbaria entering data directly into the regional database) and georeferencing so that people who wish to help in these respects can learn how to do so.

Probably the feature most appreciated by users is the existence of high quality, reliably identified images, particularly images showing the diagnostic features of a species but there are, as yet, no images for many of the species in the region. Contributions would be welcome.

There are two ways of ensuring that images are correctly identified. One is to make a herbarium specimen and link it to the image. The web site can be used to make labels for such specimens (as well as for specimens that are not linked to an image). Another is to make sure to travel with a botanist (or be a botanist) who knows the plants in the region or is, at least, prepared to identify them for you. Before being allowed to submit images or use the program for making labels, you will have to register with the portal and be approved by a curator of one of the major participants to be given the necessary permissions. After that, it is simply a matter of following the instructions.

If you are a computer programmer, your assistance in helping herbaria link to the site and in making modifications that would increase the program's efficiency would be very welcome. Please email me!* There are a number of small changes that would help speed up data entry slightly – but slightly multiplied by a few thousand is a lot of time saved. And of course

*Mary.Barkworth@usu.edu

there is the dream of modifying the program so that the site and all its features would function on tablets and cell phones. Dreams, dreams always more dreams – but what we have now was a dream twenty years ago.

Bryophytes, fungi, and lichens

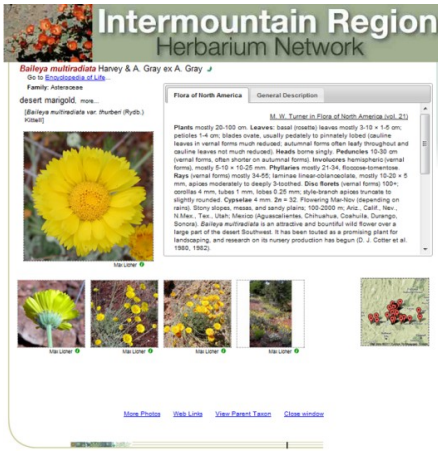
At present, the Intermountain Region Herbarium Database and portal is more or less restricted to vascular plants. It is managed using SYMBIOTA, Open Source software developed under various National Science Foundation grants to the Global Institute of Sustainability at Arizona State University. One day the Intermountain Biota web site will, if it develops as envisioned, provide access to information about all the organisms with which we share the Intermountain Region. This dream is not without foundation. In the fall of 2011, SYMBIOTA nodes were established for North American bryophytes (<http://symbiota.org/bryophytes/index.php>), fungi (<http://symbiota.org/mycology/index.php>) and lichens (<http://symbiota.org/nalichens/index.php>). Like Intermountain biota.org, these sites have only recently been started but those for bryophytes and lichens can be expected to expand rapidly thanks to funding from the National Science Foundation.

There is more information about SYMBIOTA, including a list of the nodes for which it is being used, at <http://symbiota.org/tiki/tiki-index.php>. There are video tutorials on the features described here (and others) at <http://symbiota.org/tiki/tiki-index.php?page=HelpPages>. If they do not answer your questions, email or call me.

Late breaking news!

At the end of January, Les Landrum and Daryl Lafferty of

Utah *Opuntia* Treatment in Progress: Preliminary draft published on UNPS web site



Above: Sample of descriptive page for Desert marigold. Content from the Intermountain portal builds on the work of the Southwest Environmental Information Network (SEINet) which includes additional specimen data from herbaria across the southwestern U.S. and Mexico.

Arizona State University added some new games to the Intermountain site. One is a plant a day quiz; two others focus on super-market botany. Enjoy!

Acknowledgments

Development of the regional portal has been, and will continue to be, a collaborative effort. All involved will join me in thanking Ed Gilbert for his work in developing SYMBIOTA. In addition, I thank him for the extraordinary patience he has shown in answering my inquiries and the efforts he has made to help herbaria in the region to connect to the central database. Without his efforts, and those of his colleagues in GIOS, the intermountain network would still be a dream. I also thank my colleagues at all the participating herbaria for the their work in helping make the dream of a regional network a reality and in promoting open access to herbarium information and Tony Frates for his encouragement and suggestions.

For the past several years, a group of Utah scientists and native plant enthusiasts have been collaborating on a comprehensive taxonomic treatment of the state's confusing pricklypear cacti (*Opuntia* spp.). The research team includes Dorde Woodruff (cactus specialist who worked with Dr. Lyman Benson, and for whom *Sclerocactus wrightiae* is named), Dr. Ty Harrison (plant ecologist and Emeritus Professor at Westminster College), Dr. A. Dean Stock (plant and animal cytogeneticist), and Tony Frates (Utah Rare Plant Guide coordinator, UNPS webmaster, & conservation co-chair). Additional assistance has been provided by UNPS members Blake Wellard, Kipp Lee, and Bill Gray.

The *Opuntia* team has completed a preliminary draft of their taxonomic work, which is now available on the UNPS website (<http://www.unps.org/UtahOpuntias.pdf>). People with an interest or knowledge of Utah pricklypears are encouraged to review the draft and provide feedback.

The *Opuntia* team arose from individuals with a desire to better understand the diversity of pricklypears literally growing in their own backyards. Dorde Woodruff's interest in cacti was inspired by *O. macrorhiza* plants she found growing on the home site she bought in Cottonwood in 1953. To better study the cacti she obtained an MS in biology from the University of Utah. Ty Harrison has been studying and collecting pricklypears in Nebraska, Utah, and Arizona for years, and is interested in the biogeography of Holocene relicts in northern Utah. Dean Stock observed cacti growing up in St. George and later in Texas. He recently retired to Kanab (a center of *Opuntia* endemism and hybridity) and is applying his skills as a cytogeneticist to unraveling taxonomic issues in the genus. Tony Frates is interested in all native plants, a consequence, in

part, of a winter encounter with *O. fragilis*. He got hooked on *Opuntia* in the early 1980s when he couldn't key out a large-padded, fleshy-fruited pricklypear in the *Flora of the Central Wasatch Front*.

After learning of their mutual interest in pricklypears, Dorde, Ty, and Tony joined forces in 2007 to work on *O. macrorhiza*, and its puzzling distribution pattern in Utah, where a surprisingly disjunct population occurs along the Wasatch Front. To better understand this species, they began investigating reports and specimens from elsewhere instate and beyond. This culminated in a better understanding of the fleshy and dry-fruited pricklypears in the state, and the realization that the Wasatch Front form was not typical.

The team later became aware of Dean Stock's extensive studies while trying to relocate an historical Marcus E. Jones collection from Johnson Canyon outside of Kanab. Dean had been working on his own vexing *Opuntia* questions; most notably forms of *O. pinkavae* (below) that didn't key well.

Members of the *Opuntia* team plan to name various new taxa as needed. In the meantime, they welcome feedback and are always interested in seeing pictures, particularly if they include flowers or fruits, of *Opuntia* from around the state (including location data). Send emails to: unps@unps.org. - UNPS *Opuntia* team



Above: *O. pinkavae* by Dean Stock.

Twig Talk: The Fun of Winter Botany

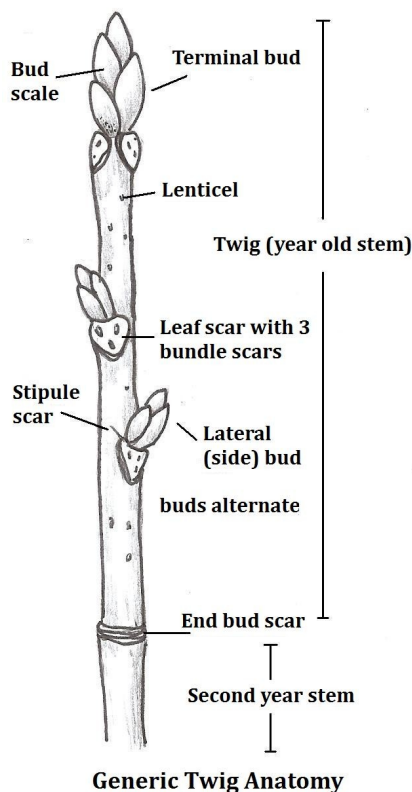
By Walter Fertig

Just as a palm reader can tell your fortune by looking at various wrinkles on your hands, a winter botanist can learn the identity of a leafless shrub or tree by reading clues found on over-wintering twigs. All it takes is a little understanding of the morphology of twigs, a hand lens, a guide book, and the desire to commune with nature when the thermometer is advising otherwise.

In botanical jargon, a “twig” is the end portion of a branch formed during the past season of growth. Twigs are set off from older parts of the stem by a ring of scar tissue called the end bud scar. This ring marks the point of attachment of last winter’s terminal bud. The age of a branch can often be determined by counting the sets of bud scale scars.

Buds are embryonic branches that bear miniature leaves or flowers. The buds are often covered by one or more leathery scales. The number and orientation of bud scales can be useful in identification. For example, blueberries and whortleberries (*Vaccinium*) can be recognized by their buds consisting of two erect, non-overlapping scales, while willows (*Salix*) are easily identified by their single, large bud scale. Most winter shrubs and trees in our area have numerous bud scales that overlap like roof shingles. One exception is Canada buffaloberry (*Shepherdia canadensis*) which exposes its embryonic leaves directly to the elements without the cover of a bud scale.

Twigs typically have a single terminal bud at the tip of the stem and several lateral or axillary buds. Oaks (*Quercus*) are an exception in that they typically have



a dense cluster of terminal buds. Lateral buds are produced in the axil of stem leaves and always have a semicircular or triangular leaf scar at their base. The leaf scar represents the point of attachment of the old leaf and is covered by a layer of corky protective cells. Each leaf scar contains one to several tiny dots or lines called bundle scars, remnants of the vascular strands of the leafstalk. The size and shape of leaf scars and the number and shape of bundle scale scars can be important features for identification.

Most woody shrubs and trees in the Rocky Mountain region have alternate lateral buds and leaf scars (occurring singly at each stem node). A smaller group of species has opposite buds and leaf scars (occurring in

opposing pairs at each stem node). Among this latter group are the maples (*Acer*), dogwoods (*Cornus*), elderberries (*Sambucus*), and ashes (*Fraxinus*).

A number of other structures can be helpful in identification when present. The presence of thorns (sharp-tipped modified branches, often with leaf scars) helps identify hawthorns (*Crataegus*), while remnant spines (derived from stipules) and prickles (epidermal outgrowths) serve to identify gooseberries (*Ribes*) and roses (*Rosa*), respectively. Stubby branches crowded with leaf scars called spur shoots are characteristic of many cherries (*Prunus*) and serviceberries (*Amelanchier*). Warty lenticels, glandular dots, and presence or absence of hairs are other surface stem characters that may be useful in keying unknown species. Remnant leaves and fruits may also be of great value.

A number of useful guides to winter plant identification have appeared, many of which are now, unfortunately, out of print. Classics like William Harlow’s *Twig Key to the Deciduous Woody Plants of Eastern North America* (1941), Morris, Schmautz, and Stickney’s *Winter Field Key to the Native Shrubs of Montana* (1962), and *Winter Guide to the Native Shrubs of the Central Rocky Mountains* by the Colorado Department of Game and Fish (1956) might still show up on ebay or a used book store. The Peterson Field Guide *Western Trees* by George Petrides (1992) is an excellent contemporary reference. Many websites also help with identification.: one that I have found especially useful is from the Burke Museum of Nat-

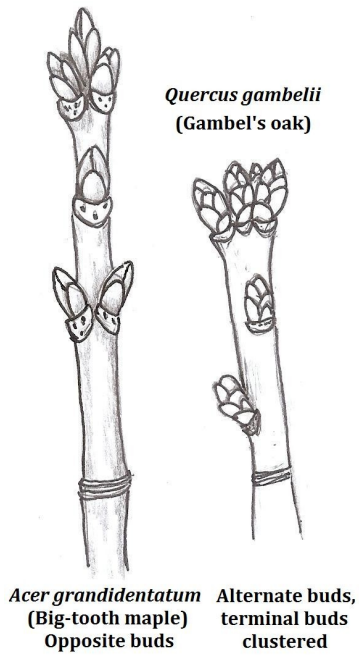
ural History and Culture in Washington state (<http://biology.burke.washington.edu/herbarium/imagecollection=php?Page=wintertwigkey.php>).

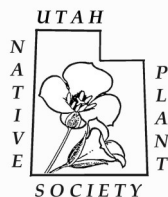
Armed with one of these references, a hand lens, and the basics of twig morphology, you should now be able to identify most shrubs and trees you encounter during Utah's long winter. But in case you need more help, the following guide may be helpful to common genera of deciduous trees and shrubs of the state:

1. Buds and leaf scars opposite
2. Twigs covered by silvery or reddish scales; buds of 2 miniature leaves *Shepherdia*
2. Twigs not covered by silvery or reddish scales; buds of hard scales
3. Leaf scars broad or wide
 4. Buds over 5 mm long and stalked *Sambucus*
 4. Buds less than 5 mm long, not stalked *Fraxinus*
3. Leaf scars narrow or V-shaped
5. Lateral buds obscure, often hidden by persistent leaf bases
6. Terminal bud large, white-hairy; bark shreddy .. *Jamesia*
6. Terminal bud absent; bark smooth *Philadelphus*
5. Lateral buds not hidden
 7. Leaf scars raised; bundle scars 1, inconspicuous *Symphoricarpos*
 7. Leaf scars not raised; bundle scars 3, prominent
 8. Bud scales 2; twigs hairy *Cornus*
 8. Bud scales 4 or more; twigs hairy or not *Acer*
1. Buds and leaf scars alternate
9. Spines, thorns, or prickles present
10. Prickles present on internodes
11. Pith (center of stem, exposed when cut in cross-section) with spongy cavities *Ribes*
11. Pith solid
 12. Base of prickle usually expanded; pith less than half diameter of twig *Rosa*
 12. Base of prickle not expanded; pith over half the diameter of twig *Rubus*

10. Spines and thorns present at nodes or tips of stem
13. Spines present at nodes
 14. Spines stout, over 1.5 cm. *Crataegus*
 14. Spines slender, less than 1.5 cm
 15. Pith with spongy cavities *Ribes*
 15. Pith solid
 16. Twigs white-woolly *Tetradymia*
 16. Twigs glabrous to sparsely hairy .. *Robinia*
13. Spines only present at stem tips
 17. Buds and twigs mealy or scurfy *Atriplex*
 17. Buds and twigs not mealy or scurfy
 18. Twigs hairy; buds on surface *Ceanothus*
 18. Twigs glabrous; buds sunken *Sarcobatus*
9. Spines, thorns, or prickles absent
 19. Buds hidden by bark or persistent leaf bases
 20. Twigs woolly or covered by felt-like hairs
 21. Stems woolly *Tetradymia*
 21. Stems with felt-like hairs ... *Chrysothamnus* or *Ericameria*
 20. Twigs not woolly or without felt-like hairs
 22. Buds hidden under bark, stems malodorous ... *Rhus*

22. Buds hidden under leaf bases
 23. Stipules persistent *Potentilla*
 23. Stipules not present *Eriogonum*
19. Buds readily visible
 24. Buds cap-like, with a single scale *Salix*
 24. Buds with 2 to several scales
 25. Buds of 2 equal scales, not overlapping *Vaccinium*
 25. Buds of 3 or more overlapping scales
 26. Buds hairy, scurfy, or with scale-like hairs
 27. Buds with silvery, scale-like hairs *Elaeagnus*
 27. Buds hairy or scurfy
 28. Buds scurfy ... *Atriplex*
 28. Buds hairy or woolly
 29. Leaf scars narrow *Amelanchier*
 29. Leaf scars broad
 30. Bundle scars 7 or more *Quercus*
 30. Bundle scars 3
 31. Twigs or buds not sticky-gummy; pith chambered ... *Celtis*
 31. Twigs or buds sticky-gummy; pith solid
 32. Buds stalked *Alnus*
 32. Buds not stalked *Betula*
 26. Buds not hairy, scurfy, or with scale-like hairs
 33. Bundle scars single
 34. Twigs angled at nodes, spur shoots absent *Sorbus*
 34. Twigs not angled at nodes; spur shoots present *Rhamnus*
 33. Bundle scars 3-many
 35. Bundle scars 7 or more; leaf scar elliptic . *Quercus*
 35. Bundle scars 3; leaf scar of various shape
 36. Leaf scars narrow *Ribes*
 36. Leaf scars broad
 37. Leaf scars triangular; buds often sticky *Populus*
 37. Leaf scars elliptical; buds not sticky *Prunus*





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Unidentified Flowering Object:

The January UFO was technically an unidentified fruiting object—the square fruit pod of Leopard lily (*Fritillaria atropurpurea*) submitted by Bill Gray

This month's UFO is a very early spring-flowering species from the Beaver Dam Mountains, (though it is also found over much of the state). It's more familiar cousins have yellow flowers. Can you name it?



To download this and previous issues of *Sego Lily* in color, read late breaking UNPS news, find links to other botanical websites, or buy wildflower posters, cds, and other neat stuff at the UNPS store go to unps.org.