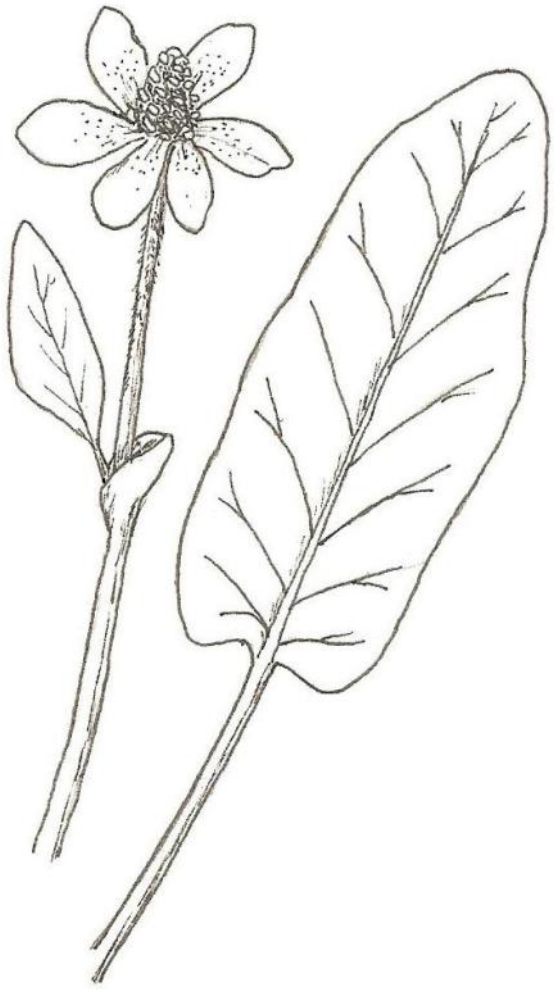
Sego Lily

Newsletter of the Utah Native Plant Society



July 2009
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In this issue:

Yerba mansa (*Anemopsis californica*), above, is known as the "gentle herb" in Spanish and is renowned for its many medicinal uses. Native Americans used the aromatic roots and leaves in a variety of teas, infusions, and poultices to treat colds, stomach ache, malaria, dysentery, diabetes, and sore throats. Modern research has corroborated the anti-inflammatory properties of chemicals in the plant's roots. In Utah, Yerba mansa is found primarily on moist, saline soils associated with seeps, streambanks, and hanging gardens in the Virgin River watershed of Washington County and in Utah County. Yerba mansa can be recognized by its elongated, cone-like inflorescence of numerous flowers, each with a small, white bract. The whole inflorescence itself is surrounded by a whorl of white petal-like bracts that are often spotted or suffused with red. Superficially, the flower cluster resembles that of the Wind-flower (*Anemone*), which accounts for its scientific name *Anemopsis* or "*Anemone*-like". *Anemopsis californica* is the only native species in the lizard-tail family (Saururaceae) in Utah. Taxonomists consider the Saururaceae to be one of the more primitive and ancient of the families of flowering plants. Illustration by Walter 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 Fitts (356-5108), or write to UNPS, PO Box 520041, Salt Lake City, UT, 84152

Sego Lily Editor: Walter Fertig (walt@kanab.net). The deadline for the September 2009 *Sego Lily* is 15 August 2009.

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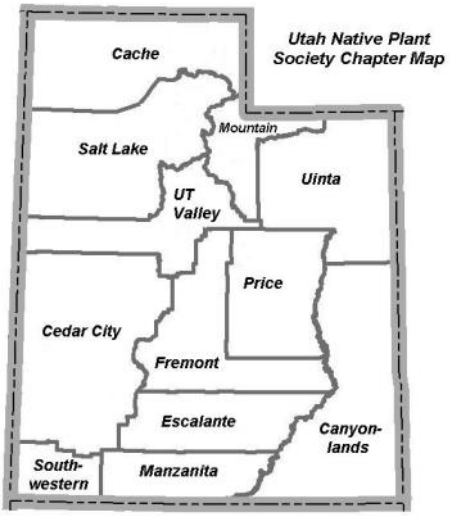
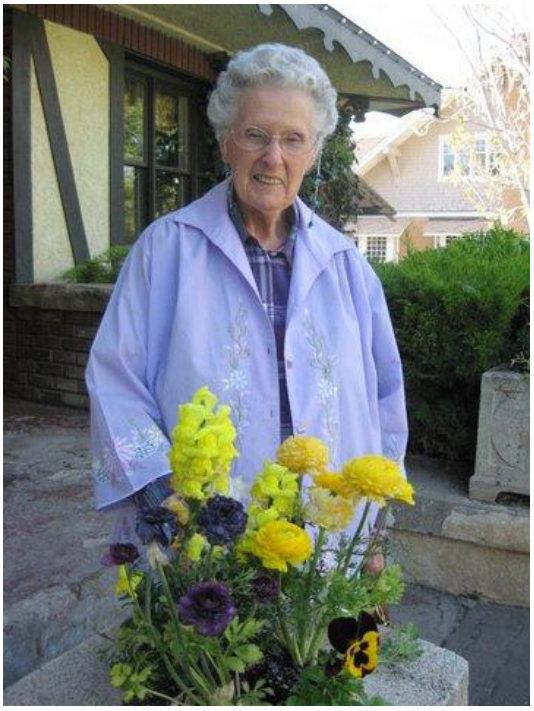
Chapter News

Cache: July 11 (Sat) White Pine Lake Wildflower Walk. Time: 9 AM. Place: First Dam Parking lot. Cost: Free. Join us for a walk from Tony Grove Lake to White Pine Lake. Along the way view spectacular wildflowers at one of the jewels of Northern Utah. There will be a number of local botanists on hand to discuss the flowers and plants. Parking at Tony Grove is very limited (and is a fee area) so we will be meeting and car pooling from the First Dam parking lot.

July 11 (Sat) Alternascapes Tour. Time: 10-3 PM. Place: SW portion of Cache Valley (Mendon, Wellsville, Young Ward). Cost: $5 Purchase tickets at the Cache County USU Extension Office. Tour 5-10 yards featuring natives or water-wise landscaping, ask questions, and get great ideas for your home landscape. Master Gardeners and Cache UNPS members will be on hand to answer questions. This tour has become a popular feature of the summer season in Cache Valley and tickets sell out fast. - *Michael Piep*



Cedar City: The Cedar Chapter is at a cross roads. For a chapter that is only 5 months old we were saddened to hear our mentor and friend Winnie Washburn will be leaving. Winnie will be moving to Pasadena,



Above: Winnie Washburn, founder of UNPS chapters in Escalante and Cedar City, on Mother's Day, 2009. We all wish Winnie well on her latest adventure in California. Photo by Harriet Priska.

California, where she will undoubtedly start another native plant chapter (of course for California). Winnie has been invaluable to our club in establishing this chapter. The chapter now enjoys a membership of 70 people. We will always value her advice and friendship and wish her well in her new adventure. She will be missed!

We held our first native plant sale in May with four vendors. Our community showed enthusiastic support and the vendors enjoyed good sales. —*Marguerite Smith*

Escalante: Summer Schedule: 4th of July BBQ Potluck at the Delthony's. Please bring an item to grill, your own beverage, and a dish to share. Social time starts at 4 PM and cooking at 5 PM.

Saturday, July 18th 9 AM Wild Flower field trip to Cedar Breaks and Picnic luncheon. Please sign up with me and indicate if you want to carpool.

Seed collecting field trip with Maria Ulloa of the Richfield BLM office has been changed to Saturday, August 22nd. Further details TBA

Mushroom field trip on Boulder Mountain September. Date TBA as Sage Sorensen deems when they are best to be seen.

Escalante Art Festival - September 25 & 26: Please be thinking about what you can donate for fundraising for the chapter and the Main Street garden funds (proceeds will be split between the two). Volunteers are needed to set up and be at the tables for a couple of hours at a time.— *Harriet Priska*

Utah Valley: Plants and Preschoolers hikes are being held every Thursday at 10 AM. So far the hikes have been great this year. The rainy weather has been good for the plant life and the nice temperatures great for hiking. The hikes are short distances and everyone is welcome to explore as we go. This summer we are likely return to Hobble Creek, Cascade Springs, the Grotto in Payson Canyon, and the falls hike in Pleasant Grove, CUWCD garden, and several sections of the Bonneville and Shoreline trails. We also hope to visit Ann Kelsey at the Natural History Museum in Salt Lake this summer. We love to try new places so give us a call and show us your favorite spot. If you are interested in joining us call Celeste Kennard at 801-377-5918 or email celeste@byu.edu

Join us as we team up with the folks at CUWCD Central Utah Water Conservancy District 355 W. University Parkway Orem, Utah 84058 on Thursday, July 2 @ 6:30 p.m. for Utah Native Plants (Principle 3) with Kent Miller of Perennial Favorites. Kent will review several native species that are excellent for use in the home landscape. – *Celeste Kennard*

UNPS Annual Summer Outing and Board Meeting: Wildflowers of Cedar Breaks, Saturday, 18 July 2009

The southernmost chapters of the Utah Native Plant Society (Cedar City, Escalante, Fremont, Manzanita-Kane, and Southwestern -Bearclaw poppy) will be hosting a wildflower hike in Cedar Breaks National Monument on Saturday, 18 July. The event will be held in conjunction with the 4th Annual Cedar Breaks Wildflower Festival (running from July 3-19). Kane County chapter President Walter Fertig will be leading hikes to see some of the monument's more showy wildflowers (such as Colorado blue columbine and Parry's primrose) as well as many of the rare and unusual plants restricted to the orange and white Claron limestone beds. The outing will commence at 9 AM in the visitor center parking lot at Cedar Breaks (there is a nominal entrance fee, collected on the honor system). Be sure to bring water, lunch, good hiking shoes, and rain and warm weather gear (at 10000 feet, Cedar Breaks can be cool and often has afternoon thunderstorms in midsummer). In the afternoon, the UNPS state board will be holding a business meeting at the picnic area or in the park housing area (depending on weather conditions). Members are invited to sit in if they wish, or spend the afternoon in further botanical pursuits. –*W. Fertig*

Bulletin Board

Spurge Purged at Bonneville CWMA Event

On May 9th, 2009, the Salt Lake County Weed Program, Utah Association of Conservation Districts, Salt Lake Soil Conservation District and Utah Native Plant society, sponsored the 3rd Annual "Purge your Spurge", myrtle spurge/ native plant exchange. The weed exchange was hosted at the Salt Lake REI and was wildly successful with over 4, 240 pounds of myrtle spurge removed. That's over 2 tons! Over 126 participants dug up the noxious weed and brought it to REI, where volunteers were able to hand out over 1,000 native plants in exchange. Participants donated a total of 229 hours for collection and restoration, some spending as much as 25 hours removing spurge from their yards.

In addition to the Myrtle Spurge Exchange, the Salt Lake Conservation District held its First Annual Native Plant Sale. Even with a bit a chaos at times, over 150 residents took advantage of the large offering of native plants and approximately 2500 native plants were sold throughout the day. We are delighted to know that more Utah native plants will fill Salt Lake County gardens to benefit wildlife and promote biodiversity.

In the end, the Native Plant Sale surpassed its fundraiser goals and brought in over 3500 dollars. All proceeds of the sale will sponsor natural resource conservation projects within Salt Lake County, including the successful Myrtle Spurge Exchange. We'd like to give a special thanks to all the volunteers that made the sale possible as well as the generous and patient plant buyers who worked with us through some unexpected plant substitutions. - *Sage Fitch, Salt Lake County Weed Specialist*

*Left: Dalmatian toadflax (*Linaria dalmatica or L. genistifolia *ssp.* dalmatica*) has showy, yellow snapdragon-like flowers and would be a fine garden plant if it would only behave and not spread into foothills grasslands and agricultural areas. Native to southern Europe (Dalmatia is on the Adriatic coast of the former Yugoslavia) and central Asia, Dalmatian toadflax first became established in Provo Canyon in the 1930s before spreading across much of the state. Photo by Tony Frates.*

Dalmatian Toadflax Added to State Noxious Weed List

In April 2009, Dalmatian toadflax (*Linaria dalmatica*) became the latest species to be officially listed as a Noxious weed by the state of Utah. Under the Utah Noxious Weed Act, "… it is the duty of every property owner to control and prevent the spread of noxious weeds on any land in his possession, or under his control …" Dalmatian toadflax is native from southern Europe to central Asia and was originally brought to North America as a garden plant in the late 1800s. It escaped from cultivation and rapidly spread across much of the western United States and Canada, especially in roadsides, fallow pastures, and rangelands. In Utah, Dalmatian toadflax occurs most commonly in the foothills of the Wasatch Front, though sporadic populations occur as far south as Kane County. Because of the waxy coating on its leaves and stems Dalmatian toadflax is difficult to control with herbicides. Several Eurasian beetles and moths are being used as biocontrol agents in the west. - *W. Fertig*

White Dome Preserve Completed

The Nature Conservancy recently received a grant of $910,500 to finalize the purchase of the 800 acre White Dome Nature Preserve south of St. George, Utah. White Dome contains approximately 20% of the remaining population of the federally Endangered Dwarf bearclaw poppy (*Arctomecon humilis*) and also preserves habitat for the Threatened Siler pincushion cactus (*Pediocactus sileri*) and numerous other uncommon Mohave Desert plant and animal species. The White Dome area had been highly threatened by rampant urban growth in the St. George area and by increased impacts from off-highway vehicle recreation and noxious weeds. Many individuals and organizations have helped make the White Dome preserve a reality, including Elaine York of TNC, the State of Utah School and Institutional Trust Lands, state of Utah, Renee Van Buren, Bob Douglas, Kim Harper, Tony Frates, Larry England, and the US Fish and Wildlife Service. - *Heather Barnes*

Attention Photographers: Photos Needed for Woody Plant Guide

Renee Van Buren of Utah Valley University needs your help. Renee and co-authors Kimball Harper and Janet Cooper are nearing completion of their book *The Woody Plants of Utah: A Field Guide and Identification Key to Trees, Shrubs, and Vines Native or Naturalized in Utah* and are missing photos of several uncommon woody species. If you have images of these species in your digital photo or slide collection and are willing to share (and attain some botanical fame), please contact Dr. Van Buren at renee.vanburen@uvu.edu. Photos in the book will be resized to 4 x 4 inches and need to have a resolution of at least 300 dpi. Images should also be sent as tiff files. Information on where the photos were taken would be helpful. The authors are trying to get the book ready for the printers this summer and would like to get as many photos as possible by mid July.

Photo Wish List

Yucca angustissima var. *toftiae* (*Y. toftiae*) Toft's yucca
Artemisia arbuscula var. *arbuscula* Low sagebrush
Artemisia arbuscula var. *longiloba* Longlobe sagebrush
Artemisia arbuscula var. *thermopola* Hot Springs sagebrush
Artemisia tridentata var. *parishii* Mojave sagebrush
Baccharis wrightii Upland baccharis
Brickellia microphylla var. *microphylla* (including var. *watsonii*) Rough brickellbush
Chrysothamnus viscidiflorus var. *axillaris* Inyo rabbitbrush
Encelia farinosa Brittlebush
Ericameria albida (*Chrysothamnus albidus*) Whiteflower rabbitbrush
Ericameria cervina (*Haplopappus cervinus*) Antelope goldenbush
Ericameria crispa (*H. crispus*) Pine Valley goldenbush
Ericameria lignumviridis (*H. lignumviridis*) Greenwood's goldenbush
Ericameria nana (*Haplopappus nanus*) Low goldenbush
Ericameria nauseosa var. *bigelovii* (*Chrysothamnus nauseosus* var. *bigelovii*) Bigelow's rubber rabbitbrush
Ericameria nauseosa var. *iridis* (*C. nauseosus* var. *iridis*) Gypsum rubber rabbitbrush
Ericameria nauseosa var. *nitida* (*C. nauseosus* var. *nitidus*) Shining rubber rabbitbrush
Ericameria nauseosa var. *psilocarpa* (*C. nauseosus* var. *psilocarpus*) Huntington rubber rabbitbrush
Gutierrezia petradoria Goldenrod snakeweed
Gutierrezia pomariensis Orchard snakeweed
Lepidospartum latisquamum Nevada broomshrub
Lorandersonia baileyi (*Chrysothamnus pulchellus* var. *baileyi*) Pretty rabbitbrush
Porophyllum gracile Odora
Xylorhiza cronquistii Cronquist woodyaster
Xylorhiza glabriuscula Smooth woodyaster
Berberis fendleri Fendler barberry
Lepidium huberi Huber's pepperplant
Lepidium moabense Moab pepperplant
Lepidium montanum var. *neeseae* Garfield County peppergrass
Coryphantha chlorantha (*C. vivipara* var. *deserti*) Desert beehive cactus
Coryphantha missouriensis Colorado Plateau beehive cactus
Cylindropuntia acanthocarpa var. *coloradensis* (*Opuntia acanthocarpa)* Buckhorn cholla
Grusonia pulchella (*Opuntia pulchella*) Sand cholla
Opuntia aurea (*O. erinacea* var. *aurea*) Pipe Spring cactus
Opuntia engelmannii var. *engelmannii* (*O. phaeacantha* var. *discata*) Frying pan prickly pear
Opuntia pinkavae (*O. basilaris* var. *woodburyi, O. macrorhiza*) Pinkava's cactus
Pediocactus winkleri Winkler's cactus
Sclerocactus blainei Blaine's fishhook cactus
Sclerocactus brevispinus Pariette fishhook cactus
Sclerocactus wetlandicus Uinta Basin fishhook cactus
Sclerocactus wrightiae Wright's fishhook cactus
Linnaea borealis Twinflower
Symphoricarpos occidentalis Western snowberry
Atriplex gardneri var. *gardneri* Gardner's saltbush
Atriplex gardneri var. *utahensis* Three-tipped saltbush
Zuckia brandegeei var. *arizonica* Arizona zuckia
Elaeagnus commutata Silverberry
Vaccinium myrtillus Myrtle blueberry
Psorothamnus arborescens var. *pubescens* Beauty indigo-bush
Psorothamnus nummularius Jones' indigo-bush
Psorothamnus thompsoniae var. *whitingii* Whiting's indigo-bush
Ribes laxiflorum Western black currant
Ribes oxyacanthoides Missouri gooseberry
Jamesia tetrapetala Basin jamesia
Menodora scabra Rough menodora
Menodora spinescens Spiny menodora
Eriogonum ammophilum (*E. nummulare* var. *ammophila*) Ibex buckwheat
Eriogonum bicolor Pretty buckwheat
Eriogonum corymbosum var. *aureum* Golden buckwheat
Eriogonum corymbosum var. *heilii* Heil's buckwheat
Eriogonum corymbosum var. *revealianum* Reveal's buckwheat
Eriogonum corymbosum var. *velutinum* Velvety buckwheat
Eriogonum heermanii var. *subspinosum* Tabeau Peak buckwheat
Eriogonum hylophilum (*E. corymbosum* var. *hylophilum*) Gate Canyon buckwheat
Eriogonum lancifolium Lanceleaf buckwheat
Eriogonum leptocladon var. *papiliunculi* Butterfly buckwheat
Eriogonum leptocladon var. *ramosissimum* San Juan buckwheat
Eriogonum leptophyllum Slenderleaf buckwheat
Eriogonum lonchophyllum Longleaf buckwheat
Eriogonum microthecum var. *lapidicola* Pahute Mesa buckwheat
Eriogonum microthecum var. *phoeniceum* Scarlet buckwheat
Eriogonum nummulare Coin buckwheat
Eriogonum smithii (*E. corymbosum* var. *smithii*) Flat top buckwheat
Eriogonum umbellatum var. *juniporinum* Juniper sulphur buckwheat
Eriogonum wrightii var. *wrightii* Wright's buckwheat
Chimaphila menziesii Menzies' chimaphila
Ceanothus greggii var. *franklinii* Franklin's ceanothus
Rhamnus alnifolia Alder buckthorn
Crataegus chrysocarpa Yellow hawthorn
Crataegus erythropoda Rocky Mountain hawthorn
Prunus emarginata Bittercherry
Rubus neomexicanus New Mexico thimbleberry
Ptelea trifoliata ssp. *pallida* Hoptree
Salix cascadensis Cascades willow
Salix melanopsis Dusky willow
Parthenocissus vitacea Thicket creeper

Ten Things You Might Not Know About Grasses (But Wish You Did)

By Walter Fertig

Grasses are nearly ubiquitous, but like many familiar things they are often taken for granted. The following collection of factoids explores some of the basics of grass morphology, ecology, and natural history. Use these kernels of agrostology (a.k.a. the study of grasses) to impress your friends, co-workers, and loved ones.

1. They may not look like much, but grasses have flowers. Grass flowers do not have showy petals to attract visually-oriented animal pollinators, such as butterflies, bees, and hummingbirds. Each flower consists of a minute pair of sepals (called lodicules), 3 stamens, and an ovary derived from 2 fused carpels. Furthermore, the grass flower is wrapped in a series of green or straw-colored scales or bracts (actually modified leaves). A single grass flower, called a floret, is enclosed by two bracts: a large (relatively speaking), many-veined lemma and a smaller, 2-veined palea. Each floret is further enclosed by a pair of larger scales called glumes. A set of one or more florets and their associated pair of glumes is called a spikelet. Grass spikelets vary in size, number of florets, presence of long, spine-like extensions (awns), degree of venation, presence of hairs, size of glumes, etc., but all are built on the same fundamental design. Once this basic pattern is learned, grass identification becomes a lot simpler. Spikelet characteristics provide the best means for identifying grasses to genus or species.

2. Grass flowers are pollinated via the wind - which is why many people suffer from hay fever. Grasses, many trees and shrubs, and some weedy plants are pollinated by the wind, rather than animals, and so do not need to advertise themselves with large, colorful petals (indeed, these would interfere with the dispersal and capture of pollen). At maturity, grass spikelets often dangle on thin stalks, allowing them to dance about in the slightest breeze and shake their pollen loose. Wind-borne pollen grains tend to be very small and lightweight, so as to better float through the air. The odds of any single pollen grain reaching the receptive stigma of another flower of the same species are quite low, so wind-pollinated (or anemophilous) plants must produce exceptionally large numbers of pollen to saturate the market.

Above, left: Spikelet of Alpine bluegrass (Poa alpina*), consisting of two glumes (lowest pair of bracts) and 5 florets. Above, right: a single floret with 3 stamens, a membranous palea, and a large lemma. Illustration by W. Fertig.*

One in fourteen Americans suffer from hay-fever, and many are allergic to grass pollen. Hay-fever results from the body's own immune system over-reacting to the presence of proteins on the surface of pollen grains that have floated on the wind into the nasal passages. Specialized cells in the immune system respond to the foreign proteins by releasing histamine and other chemicals to fight off the invaders. These compounds cause the symptoms of hay fever – itching, sneezing, congestion, and fatigue.

3. Vegetatively, grasses all kind of look alike, but there are some good (though subtle) characters for identification. Grass leaves are typically long and linear and attached to the stem (called the culm in technical botanical jargon) at a knob-like, swollen node. The blade or lamina of the leaf wraps around the culm to form a long sheath which may be fused below the base (forming a V, like a V-necked sweater), open the entire length, or overlapping. Most

grass plants have a membranous structure called a ligule, inserted at the juncture of the leaf blade and culm. The size, shape, and form of the ligule (especially whether the tip is squared off, pointed, lacerated, or split into numerous hairs) is useful for identifying grass species in the absence of flowers. The presence of a ligule is a unique feature of the grass family. Some grasses also have ear-like flaps of tissue at the top of the leaf sheath, which can be helpful for identification.

4. Not all grass-like plants are true grasses. Sedges (family Cyperaceae) are close relatives of grasses with flowers enclosed by bracts and a grass-like appearance, but differ in having 3-sided stems, leaves in 3 ranks, no ligules, flowers being enclosed by a single bract, and fruits being 1-seed achenes rather than caryopses. Rushes (family Juncaceae) have brown or greenish petals and sepals and capsule-like fruits with numerous, tiny seeds. Despite their appearance, they are not especially closely related to grasses. A number of other species have the word "grass" in their name (blue-eyed grass, grass of Parnassus, arrowgrass, cottongrass, beargrass), but none are in the grass family (Poaceae or Gramineae).

5. The grass family is one of the most species-rich groups of plants. Worldwide, the Poaceae is the fourth largest family of vascular plants. Grass specialists (agrostologists) recognize 650-700 genera in the Poaceae and 10,000-11,000 species* in the world. Only the orchid (Orchidaceae), sunflower (Asteraceae or Compositae), and pea (Fabaceae or Leguminosae) families have more species. In North America and Utah, grasses are second only to the sunflowers in species richness. The 4th edition of *A Utah Flora* includes 286 native and introduced grass species. By comparison there are 671 species in the sunflower family in Utah.

6. Economically, the grass family is the most valuable of any group of vascular plants. The majority of our most important food crops belong to the grass family. These include: Corn or maize (*Zea*), Wheat (*Triticum*), Rice (*Oryza*), Oats (*Avena*), Barley *(Hordeum*), Rye (*Secale*), Sorghum (*Sorghum*), and Sugar cane (*Saccharum*). Several alcoholic beverages are derived from fermentation of malted grasses, as well as grain alcohol (an additive in gasoline). The grass family also provides forage for the majority of our domestic livestock – either on native rangelands or as hay or grain in feedlots. Bamboos are woody grasses of tropical areas and the Old World (poorly represented in North America) that are an important source of construction materials (pipes, scaffolding, flooring, furniture) and also food (bamboo shoots). Native Americans used pliable grass stems and leaves for basketry. Cultivated grasses are grown widely for lawns, parks, playing fields, and landscaping.

There is increasing interest in using cultivated corn and native grasses (especially switchgrass, *Panicum virgatum*) as biofuels to augment dwindling petroleum reserves and potentially reduce greenhouse gas emissions. This is not without controversy, as cultivation of these crops is less efficient than often touted. A recent study suggests that 35% of the surface area of the United States would need to be devoted exclusively to raising biofuel crops to meet the country's energy needs.

7. Ecologically, grasses are among the most important species in many native ecosystems. Grasses are often the dominant vegetation in the world's prairie and grassland habitats and a significant component of arctic and alpine tundra, wetlands, savanna, forest, and desert habitats. Members of the grass family are an important source of food for numerous grazing animals, ranging from insects to rodents, rabbits, and hoofed animals. These in turn are food for carnivores. Grasses are significant for reducing soil erosion and providing material for nesting animals.

8. Grasses have a lot of tricks up their sheaths for avoiding herbivory and for dispersal. Most plants try to avoid being grazed by producing bad-tasting or poisonous chemical compounds, growing low to the ground (too low for many grazers to reach), or having sharp spines. Grasses typically lack all of these defenses and instead choose to simply grow faster than herbivores can eat them. Grass leaves are unusual in that they can continue to grow after they mature. In most plants, all the cells of a leaf are produced in the embryonic bud and growth is simply a matter of these cells expanding to their mature size. Any damage to such a leaf is usually permanent. By contrast, the active growing center of a grass leaf (called the meristem) is located near the base of the blade and continues producing new cells, even as the upper parts of the blade might be damaged or lost to grazers. So long as an herbivore does not pull out the entire grass plant or eat down below the meristem, a grass can continue to grow under grazing pressure. This ability also explains why a mowed lawn quickly grows back. Grass leaves actually grow in much the same way as our hair – thus it would be more correct to say someone has grassy rather than bushy hair if they are overdue for the barbershop.

While grass leaves are edible they are tough on the teeth of grazing animals. This is due to the presence of specialized cells in the leaf epidermis called phytoliths (literally 'leaf stones') that are rich in silicon dioxide, the main ingredient in sand. Chewing grass leaves all day is not unlike nibbling on sand and long-term exposure can result in a lot of abrasion to tooth enamel. Many grazing animals have evolved high-crowned teeth that continue to grow from their base as they get progressively worn at the tips (not unlike the grass leaves themselves with their basal meristems).

Grasses have several strategies for reproduction and dissemination. While most grasses reproduce by seeds, a few species have replaced their ordinary florets with asexually-produced bulb-like structures called

*Grass experts don't agree on the number of genera and species and lots of other things. Best to only invite one to a party.

Contracted Indian ricegrass (*Achnatherum contractum* or *Oryzopsis contracta*) is a native, perennial bunchgrass found primarily in Wyoming, but also extending into southwestern Montana and northern Colorado. In July 1995, Charmaine Refsdal Delmatier, then a graduate student from the University of Wyoming, discovered Contracted Indian ricegrass at two sites in the vicinity of Manila (Daggett County) in northeastern Utah. This species breeds true but is believed to have originated as a hybrid between Indian ricegrass (*Achnatherum, Oryzopsis,* or *Stipa hymenoides*) and Littleseed ricegrass (*Piptatherum micranthum* or *Oryzopsis micrantha*). Morphologically, Contracted Indian ricegrass closely resembles its ubiquitous parent, Indian ricegrass, in having large, pearly spikelets, short and deciduous awns, and pubescent lemmas. *Contracta* differs from *hymenoides* in having much shorter lemma hairs, more slender spikelets, and more stiffly branched pedicels. The lemma hairs of *hymenoides* are much longer than the lemma itself and emerge out of the glumes in a thick tuft, much like the Mohawk hair style popularized by 80's television personality Mr. T. By contrast, the short hairs of *contracta* barely exceed the lemma and look much like the crewcut of Johnny Unitas. Some keys emphasize the contracted nature of the panicle of *Achnatherum contractum* (the branches are all appressed rather than widely spreading), but this feature is often only evident on young inflorescences that have not fully expanded from the boot stage.

Contracted Indian ricegrass was formerly a Category 2 candidate under study for potential protection under the US Endangered Species Act. Surveys in the 1990s found this species to be sufficiently widespread in Wyoming to be dropped from consideration. Additional populations should be sought in Utah, especially in the Uinta Basin, the north flanks of the Uinta Mountains, and the Cache Valley. —*W. Fertig*

Achnatherum contractum. *Refsdal # 5448* (RM). UT: Daggett Co., ca 5.5 air miles W of Manila, ca 0.2 miles W of Utah Highway 44. T3N R18E S24 SE4. Elev 7320-7440 ft.

Above: Contracted Indian ricegrass by Isobel Nichols, from *Wyoming Rare Plant Field Guide* (1994).

A grass can be "glumey" in more ways than one, when its identification remains to be done. You pull off the parts, and soon feel your age chasing them over the microscope stage. You peer through the lenses at all of the bracts and hope your decisions agree with the facts. While your oculist chortles with avid delight as you strain both your eyes in the dim table light. You are left on the horns of quite a dilemma when you count the nerves on the back of the lemma. Then you really get snoopy and turn each one turtle to see if the flower is sterile or fertile. And then the compression – no problem is meaner- is it flat like your wallet or round like a wiener? "How simple" you think "for a mind that is keen." But what do you do when it's halfway between? You probe and you guess how the florets will shatter for you know later on it's certain to matter. You long for the calmness of labor that's manual when the question arises: "perennial or annual?" And that terrible texture, the meanest of all, is one of the pitfalls in which you may fall. "Cartilaginous" maybe – or is it "chartaceous" – has even the experts exclaiming "good gracious!" Then you wail as you wade through the long tribal key "Oh why must this awful thing happen to me?" "Grasses are easy" our teacher declares as he mops off a brow that is crowned with gray hairs! – *H.D. Harrington*, author of *Manual of the Plants of Colorado* and *Edible Native Plants of the Rocky Mountains*.

bulbils or bulblets. These look like miniature plants (which in a sense they are) and can immediately sprout into new individuals when they reach the ground, bypassing the seed stage. Being asexual, the new plants are genetically identical to their parent. Grasses can also spread clonally by above-ground stem-like stolons or below-ground rhizomes. Rhizomatous grasses often grow in lines or form dense turfs, making them well-suited for our lawn. Bunchgrasses do not spread widely by rhizomes but instead form dense tussocks. Annual grasses do not form large clumps or spread by rhizomes, but instead put all their reproductive energy into producing large quantities of seed during their short life span (just a few months). Annuals are designed to withstand periods of drought, fire, or other extreme events by living underground as seeds until conditions improve again.

9. Grasses have invented two forms of photosynthesis – one form specially adapted for desert environments. Photosynthesis is the chemical process by which green plants, algae, and certain bacteria and cyanobacteria convert solar energy into food. Most plant species (including a majority of grasses) utilize the C3 pathway of photosynthesis, so-named because the first stable product produced during the process is a sugar with 3 carbon atoms. Some desert grasses utilize the C4 photosynthetic pathway, named for the four-carbon sugar created in the first step. More significantly, C4 species are able to efficiently store carbon in their cells to always keep the concentration of CO_2 gas low in the internal air spaces of the leaf, allowing CO_2 to be more readily taken up from the atmosphere. By being more efficient at carbon uptake (CO_2, water, and sunlight are the raw materials in making simple sugars in photosynthesis), C4 grasses are able to close the pores in their leaves (called stomates) during the hottest parts of the day, thereby reducing loss of water via transpiration and evaporation. Thus C4 grasses are better adapted for survival in hot, arid climates than their C3 cousins. C4 grasses are often called warm season grasses because they tend to reproduce and do most of their growth during the warmest seasons of the year (as opposed to C3 or cool season grasses, which reproduce and flourish in the spring when soil water is not limiting).

10. The composition and abundance of grasses in the environment is changing. While nothing stays the same forever, our native grassland communities are undergoing a number of changes, many of which are not desirable. Many grasslands, such as those of the Great Plains, Washington's Palouse Prairie, and California's Central Valley, occur on rich soils that are well suited for agriculture (especially the culture of edible grasses like wheat and corn). Few areas of native prairie remain in these regions. In the more arid parts of the west, grass communities have been historically used as rangelands for domestic livestock. Too often these lands have been subjected to prolonged grazing with inadequate rest or rotation, grazed in inappropriate seasons (such as the critical window in spring when perennial grasses produce flowers and seed), been grazed by too many animals, or been converted from native grasslands to short-lived seedings of exotic species prone to failure in periods of extended drought. The consequences of such management are rangelands with decreased grass cover, accelerated soil erosion, replacement of edible cool season perennial bunchgrasses with less palatable warm season or annual species, or shifts in abundance of native grasses towards less edible shrubby species. Predicted climate changes (more drought, higher temperatures) will likely exacerbate the trends towards woodier vegetation and annual grasslands that are more prone to wildfire and less productive. While few grass species are in danger of extinction, major shifts in the abundance and distribution of important grasses can significantly diminish the value of rangelands for commercial use and as habitat for wildlife.

Botanist's Bookshelf: Summer Reading Edition

Landscaping on the New Frontier
Waterwise Design for the Intermountain West

Landscaping on the New Frontier: Waterwise Design for the Intermountain West. By Susan E. Meyer, Roger K. Kjelgren, Darrel G. Morrison, and William A. Varga. Illustrations by Bettina Schultz. 2009. Utah State University Press, Logan , UT. 241 pp.

By now we all know that water is a limited resource in the arid portions of the western United States. Gardeners need to do their part to conserve water, if not out of civic duty then to save money on monthly water bills. A number of native landscaping books have appeared over the past few years beating the drum of water-wise gardening - so many in fact that the message is becoming trite, not unlike admonitions to eat one's vegetables and drink one's milk.

The new book *Landscaping on the New Frontier* approaches waterwise gardening from a fresh approach. The water conservation message is still there for sure, and the book devotes significant portions of three chapters to tips on harvesting rain water, designing and installing drip irrigation systems, and taking advantage of natural terrain features to improve water distribution. But the core message of the book is that western gardeners should use plants adapted to the local area because these plants are beautiful, as are their native habitats. There is no need to slavishly follow convention and try to recreate English-style gardens (or their modern suburban equivalents) in a land with so many beautiful flowering species already present. Saving water just happens to be a side benefit of landscaping with native plants.

Landscaping on the New Frontier opens with a succinct description of the major natural plant communities of the Intermountain west – that mostly arid region stretching from the Columbia Plateau of central Washington to the Colorado Plateau of northern Arizona and New Mexico. This section provides a number of basic ecological lessons in how elevation, topography, soils, and climate affect how different plant species are arrayed across the landscape from lowland deserts to alpine mountain tops. Understanding that different plants have different needs is critical for guiding the selection, placement, and care of native species in garden settings.

Above: *Dorr's sage (*Salvia dorrii*) is a native shrub well-adapted to aridic parts of the Intermountain West. Photo by Steve Dahl.*

One of the strengths of *Landscaping on the New Frontier* is how the authors translate the lessons from ecology into the designing of natural landscapes. In nature plants are rarely distributed at random (or in regular rows), but instead form clumps or occur in complicated mixtures with other species. These same patterns create interesting and visually pleasing designs in the garden setting. Aside from aesthetics, knowing where to place native plants according to their soil, light, and drainage preferences increases the likelihood of success and reduces time and expense in upkeep.

Much of the remainder of the book covers specific steps needed to convert the landscaping plan into reality. Here the authors provide useful advice on removing existing vegetation, dealing with weeds, installing stone walls and walkways, implementing irrigation systems, planting, mulching, and the many other steps needed to create a functioning garden.

Perhaps the most informative part of *Landscaping on the New Frontier* is a series of short case studies written by "native landscape pioneers". These brave souls relay stories of their successes (and failures) in creating native landscapes from scratch (at a newly excavated homesite) or from the wreckage of suburban Kentucky bluegrass or weed monocultures. These examples should provide neophyte native plant gardeners with the courage and wisdom to boldly march ahead.

The book concludes with brief summaries of 100 native wildflowers, grasses, trees, and shrubs recommended by the authors for use in

the Intermountain area. Each account includes a color photo highlighting the plant's charms (the photos alone are worth the purchase price), as well as descriptions of soil, water, and shade requirements, flowering period, growth rate, height, and cultivation tips.

UNPS members will recognize the name of the lead author, Susan Meyer, from her many years of service to the society (most notably in helping organize the popular propagation workshops around the state). The other authors include current and former faculty members at Utah State University who bring many years of experience in landscape design and low-water horticulture. Bitsy Schultz, also well-known to *Sego Lily* readers for her artwork, provided the illustrations. Thanks are extended to all of the authors for making such a worthy contribution to the native plant gardening and landscaping literature of our area.

Other Recent Botanical Titles:

Manual of Grasses for North America. Edited by Mary E. Barkworth, Laurel K. Anderton, Kathleen M. Capels, Sandy Long, and Michael Piep. 2007. Intermountain Herbarium and Utah State University Press, Logan, UT. 628 pp.

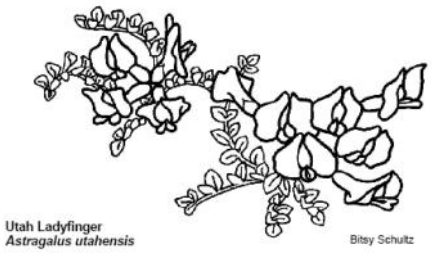
The grass family is one of the most economically important and species-rich plant families in North America. Identifying the nearly 1400 native and introduced species found on the continent can present a real challenge, as the diagnostic features of grass flowers and leaves are often small or obscure and the terminology used to describe them unfamiliar and confusing. *Manual of Grasses for North America*, edited by grass expert Mary Barkworth and colleagues from the Intermountain Herbarium of Utah State University, is the most complete one-volume guide to this important group. Make no mistake, the *Manual* is intended as a technical treatment and is geared for professional taxonomists and advanced students with a working familiarity of botanical terminology (no glossary is included) and experience with keys. The new book is essentially a condensed version of volumes 24 and 25 of the *Flora of North America*, though considerably smaller (at nearly 1900 pages the FNA volumes are too hefty for practical use in the field). Just a handful of new species and taxonomic combinations have been made in the *Manual*, reflecting new discoveries since the FNA volumes were completed in early 2007. Many generic names may be unfamiliar, however, especially among the wheatgrasses (*Elymus* and related taxa) and ricegrasses (*Stipa, Oryzopsis*, and relatives), but reflect recent advances in taxonomic knowledge. The book includes all the line drawings (one for each taxon and all of high quality) and range maps found in the two volume FNA work, though all are greatly reduced in size. The manual also has eliminated the descriptions of each species and the citations. True grass aficionados may be better served by the FNA volumes, but for a relatively portable, one-volume treatment, the new *Manual* is a worthy additon to the library.

National Wildlife Federation Field Guide to Trees of North America. 2008. By Bruce Kershner, Daniel Mathews, Gil Nelson, and Richard Spellenberg. Sterling Publishing Co., New York. 528 pp.

The number, quality, and heft of popular field guides to natural history subjects has mushroomed in the past 20 years (a welcome development to this confirmed bibliophile). This new guide is similar to the Peterson series in organizing tree species by leaf shape and type (rather than phylogenetically), but differs in using color photographs of leaves, bark, flowers, and fruits rather than paintings or line drawings. The print quality of the photos is of high quality (better than the comparable Audubon Society tree guides from the late 1970s) and do an outstanding job of highlighting the key characteristics needed for identification. The photos are supplemented by unique range maps that depict where species are most commonly found across North America in one color and where they are less frequent in another. The descriptions are succinct but readable and the authors do a good job of highlighting differences between each species and their look-alikes. A fair amount of natural history lore is also included, making this one of the few field guides that offers more than just basic identification tips. Comparison tables are also provided for some of the more species-rich or tricky groups. Although not especially compact (one would be hard pressed to fit this chunky book in their back pocket), this is a great all-around guide and useful desktop reference.

Edible: An Illustrated Guide to the World's Food Plants. Edited by Josephine Bacon, et al. 2008. National Geographic Society, Washington, DC. 360 pp.

Scientists estimate that nearly half of all the energy and protein humans derive from food comes from just three plants: wheat, rice, and corn (maize). Yet perhaps 80,000 of the 350,000 plant species estimated to occur worldwide are thought to be edible and nearly 3000 species are regularly used by people across the globe. The new book *Edible* focuses on 450 of the world's consumable fruits, nuts, grains, vegetables, spices, herbs, and beverage plants. Many are exotic species that will be unfamiliar to many American consumers (or at least won't show up at a generic supermarket with the iceberg lettuce and hard, pink squares marketed as 'tomatoes'). Each encyclopedia-like entry addresses the historical origins of the species as a food plant, how it can be prepared, and basic botanical facts and lore and most include an artful photograph. With so many species to cover the individual entries are a little thin, but overall the book attains its goal of broadly describing the amazing diversity of plant life that feeds a hungry world. -*Walter Fertig*



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