



Sego Lily

Newsletter of the Utah Native Plant Society

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Cronquist's woodyaster

(*Xylorhiza cronquistii*) is a white-flowered, daisy-like member of the Sunflower family (Asteraceae or Compositae) that is found only in Kane and Garfield Counties. Genetic evidence strongly suggests that this species is of hybrid origin, involving a cross between Hurtleaf woodyaster (*X. tortifolia*) and Henrieville woodyaster (*X. confertifolia*). *X. cronquistii* has narrow leaves like *X. confertifolia*, but short teeth and long-pointed involucre bracts like *X. tortifolia*. Cronquist's woodyaster is named in honor of Arthur Cronquist, one of the most famous American botanists of the 20th Century, who first discovered the Henrieville woodyaster while botanizing southern Utah in the 1960s. It typically grows on barren, rocky slopes of the Kaiparowits or Chinle formations and flowers in mid May to early June. Illustration by Kaye Thorne from the *Utah Rare Plant Field Guide*.

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Utah Native Plant Society



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Chapter News

Escalante (Garfield County):

Back in October, the Escalante Chapter took on several tasks. The chapter co-hosted a talk entitled Rainwater Harvesting 101 presented by Jeff and Anna Sanders of Boulder. We also hosted a presentation by Doug Reynolds, of Iron County, during which he spoke about the "Challenges of Restoration in an Age of Weeds." Lastly, the chapter sponsored and staffed a table at the Annual Escalante Canyons Arts Festival (our primary fund-raiser each year). At the table we shared literature on native plants and provided an opportunity for more people to learn about the chapter and join our mailing list.

In December, Louise and Larry Barnes opened their beautiful historic home to host the annual potluck-style holiday party which was

a great way to socialize and interact with our friends and neighbors who share a passion for native plants. We collected food to donate to the local food bank, exchanged small plant-related gifts, and shared some wonderful food.—*Alysia Angus*

Manzanita (Kane County):

Tim Clarke of Boulder, UT, regaled our group with stories about incorporating native plants into landscape design at our December meeting. For 2008, our slate of events and speakers includes Laura Fertig on getting to Rainbow Bridge National Monument the hard way (and the spring wildflowers found on the overland route) in February, Roger Hoverman discussing wildfire dynamics and how to landscape to reduce fire risk in March, and Bala Chaudhary of Northern Arizona University discussing the hidden world beneath

the soil that influences the survival of native plants we enjoy seeing above ground in April. We will also have a special surprise for our January meeting. As soon as I figure out what it is, I'll get the word out to our chapter members by e-mail!- *Walter Fertig*

Salt Lake: At our December meeting we had a pair of speakers talk on "Emigration Canyon: an Uneasy Interface between Man and Nature". Emigration Canyon, right next to Salt Lake City, is where the Donner party and the Mormon pioneers entered the Valley. Cindy Furse spoke on the amazingly diverse set of events that shaped the canyon since then, while Sarah Bennett told us about the recent efforts to establish a trail system. Mix this in with exclusive real estate development, watershed issues, and fire control, and you have a fragile coexistence. - *Kipp Lee*

Southern (Washington Co.)

Good news! First, we have a new Program Chair, Barbara Farnsworth, who is eager to get some interesting meetings for us all. The first meeting will be Monday, February 4, at 7 PM in Springdale. It will be on the sex life of plants by Carolyn Shelton of the Grand Staircase-Escalante National Monument. The meeting will be in the new Springdale Community Center, 126 Lion Blvd (located next to the new library on the road to the O.C. Tanner Amphitheater). Contact Barbara Farnsworth for more information (435/772-0525).

Second - With water becoming ever and ever scarcer in southwestern Utah, it's high time for you to get going on that native landscape you've been thinking about but haven't gotten around to! And here's your chance to get started! The Southern Chapter's (annual) Propagation Workshop will be on February 2 this year. Fee is \$20. Sign up through Zion Canyon Field Institute, Zion National Park, Springdale, UT 84767. (435) 772-3264 or 1-800-635-3959. Class is limited to 15, and it always fills up—so get your registration in early. This year we will also have some seed collected around Kanab, for use by people who live in that higher-elevation area. The instructor will again be USU Extension agent Rick Heflebower.

Lastly—the Zion Canyon Field Institute will also be holding two other native plant workshops this spring: Native Plants and Xeriscaping, taught by Lisa Ogden on March 22, and Organic Gardening, taught by Aviva O'Neil on February 23. Contact the Field Institute for further information —Margaret Malm and Barbara Farnsworth

Utah Valley (Utah Co): This year is the 10th Anniversary of the Utah Heritage Garden Program. Please come and join us for several activities to celebrate this anniversary year.



Left: Budding botanists Thomas and Moriah Kennard in the scrub oak leaves during the Plants and Preschoolers hike in Rock Canyon. Photo by Mama Celeste Kennard.

Join us for Plants and Preschoolers at Wasatch Elementary (1040N 900E in Provo) for a tour of the garden designed to catch the attention of the young at heart. The trip will be during the first spring-like week in February. We are also planning a "Garden Art" activity at Wasatch Garden in the spring to learn about drawing plants. Let us know if this should be an evening or morning event.

We will be planning work days in mid-March at the Wasatch garden and the Utah Central Water Conservancy District. Look for more details in the March *Sego Lily*. Please contact us if you are willing to help with planning an anniversary celebration. We would especially love to hear from all those who helped plant the gardens over the years. Contact celeste.p.kennard@gmail.com with suggestions and for details.

Late Fall Activity report: We ended the Plants and Preschoolers year with some great trips during those last warm sunny days in October and November. At Utah Lake State park we got a tour of the proposed nature walk trail. We went to Big Springs in the south Fork of Provo Canyon. I had never been to this trail and it was a treat. All the leaves were turning colors, the children had fun crossing several small bridges and we only lost one shoe in the stream. This site also had a great picnic area and we stopped for hot chocolate afterwards and had a treasure hunt along the trail. I highly recommend the hike for all ages and abilities. Finally our last

hike of the season was to visit the Heritage Garden at Rock Canyon Trailhead. — Celeste Kennard

Bulletin Board

2008 Rare Plant Conference

The 7th annual Red Butte Garden-UNPS co-sponsored rare plant task force conference will be held in Salt Lake City on Tuesday, March 4, 2008 from 9 AM to 5 PM. Past participants will receive an email notification with further details.

The agenda will follow a format similar to prior years involving a series of short presentations by a variety of individuals working on Utah rare plant related conservation projects, including updates of projects discussed at prior meetings, ongoing/new projects, and an opportunity for general networking and for providing input relating to the status of Utah rare plants.

There will be a small registration fee. While the meeting is typically attended by those who have jobs that somehow relate to rare plants, it is open to anyone interested in attending subject to space availability. For more details or to be placed on the meeting invitation list, please email unps@unps.org.—Tony Frates

Lifetime Members Update

New lifetime members in 2007 include Lois Arnow, Denise van Keuren, Paul and Catherine Thalmann, and Ann and Gale Dick (bringing the total to 30). Thanks to all of our new and renewing 2007 members.—Tony Frates

Prickly Pears as Food Plants

By Dorde Woodruff

Prickly pears have a very long history as food plants. The pads can be consumed as vegetables and some have edible fruits. Seeds are also very nutritious, but they're quite hard and difficult to grind.

Fleshy-fruited species are the ones we use for food. (Native Americans used dry-fruited species that were often far spinier.) Of Utah natives this means *Opuntia macrorhiza* (Tuberous-rooted prickly pear), a somewhat scarce, small, hardy species, and *O. phaeacantha* (Brown-spined prickly pear), a common species of Southern Utah (depending on your authority regarding nomenclature). A horticultural variety, *O. lindheimeri* var. *linguiformis* (Cow's tongue prickly pear), named for its long slender pads, is a great food plant, grown quite often around St. George. It makes huge shrubs, as well as having tender, relatively spineless pads, and larger fruits than the native species.

O. macrorhiza grows sparsely on the southeast bench of the Salt Lake Valley, and according to our prolific plant collector, Dr. Stanley Welsh of BYU, is fairly abundant near Zion in eastern Washington County and western Kane County. He also cites it from Iron, Piute, and San Juan counties, but like many aspects of cactus distribution in Utah, the geography of this species needs more work.

Somewhat more frost-tender, *O. phaeacantha* is quite a different case, being much larger, upright rather than sprawling, and much more common in Utah. It's abundant around the edges of the Pine Valley Mountains, north to the south end of the Wah Wahs, through Zion and on the south side of Boulder Mountain, and across to Canyonlands. The farthest north I've seen it in the East Desert is at the north end of U72 near Salina Canyon, but I can no longer find it there. In Utah it commonly goes farther north on the east side of the Colorado River than on the west side.



Above: Fruits on *Opuntia phaeacantha*, San Juan County. These are more orange-hued than most. The yellow mass on one pad is insect damage.

Opuntia pads are renowned for their health-giving quality, and the fruits for their delicate flavor. But being cacti, they demand some special understanding and techniques for their use. The problems are not only the spines but also the small barbed glochids and mucilage.

In spite of this, cactus pads are one of the most popular vegetables in Mexico, and the fruits are quite sought after as well. Cactus pads are most often referred to as nopales (singular, nopal), in Mexican recipes, but are also called "cactus paddles", "cactus leaves" (wrong, cactus pads are stems), "edible cactus", "shovels" (translation of Mexican slang), and the like. The word nopales is from Nahuatl, the language of the Aztecs, *nopalli*; the Spanish conquistadores found the Aztecs to be avid consumers of cacti. Cut-up cactus pads are called nopalitos.

It's the mucilages of the pads that make them so very healthy, in addition to their good vitamin and mineral content. As complex polysaccharides, these mucilages are

an antidote to the all-too-readily-assimilated, all-too-abundant simple carbs of the standard American diet, a big factor in the current epidemic of obesity that health providers are so worried about.

Americans are fussier about mucilages than Mexicans, who rather drolly call them *baba*, drool. One of the aspects of learning to cook nopales is how to manage the mucilage. The amount depends on the usual variables of plants, the species, the individual plant, the time of year, etc., as well the effect of other ingredients of the dish. The valuable but pesky mucilage sinks seamlessly into some dishes, like spaghetti sauce or meatloaf. For use in salads, where nopalitos can be at their drippy worst, they can be seared in a hot, dry, cast iron skillet briefly to seal them.

Getting rid of the spines, glochids, and the dry brown areoles from which they arise is the basis of preparing nopales. Mexican street vendors can do this in seconds, so there is hope. A handy way is to fasten the top of the pad under a clip-

board—one with an old-fashioned big strong clip, not a wimpy small one—and to use a very sharp knife to cut or scrape off the areoles with their spines and glochids. Then cut off the edges of the pad where the glochids cluster. Swap sides and ends to finish the job. Finally, cut off the small, inside end which is a bit fibrous.

Opuntia fruit, also, has to be handled carefully with tools until the glochids are removed. Fleshy fruits usually don't have spines, and glochids are sparser than on dry fruited species. Rub glochids off with paper towels, or roll the fruit in fine dirt or sand. Brief freezing makes glochids go limp and doesn't seem to hurt the fruit much. Once de-prickled, peel it, cut the dry top end off, cut in half, scrape out seeds with a small spoon, and you have a delicious morsel.

Or bypass all of this, and process and strain the fruits to make puree that can be used in an endless array of desserts, sauces, drinks, or other dishes. Steam-juiced unpeeled fruits, if they don't taste too "stemmy" depending on the clone, make great juice or wine. The juice combines well with other fruit juices. Surprisingly, cactus fruits are not very acid, so can't be safely canned by the water bath method. Puree or juice freezes well, however.

Nopales are especially compatible with tomatoes and cheese in dishes. Recipes for them used to be hard to come by, gleaned one by one from Southwestern or Mexican cookbooks, from foragers, or from cactus fanciers. Two compilations of amateur cactus recipes, (unedited and untested) are from the Cactus and Succulent Society of America and the Texas Prickly Pear Council. The only published cactus cookbook in English is 2004's *The Prickly Pear Cookbook* by a long-time writer about wild foods of the Southwest, Carolyn Niethammer. However, cactus recipes are now on the Internet by the thousands.

Nopales are especially favored by diabetics and overweight people, who have the most to gain (or lose, as the case may be) from eating them, which must be done regularly to be of continuing benefit.



Above: Cut-up Utah prickly pear fruits. Lower left, *Opuntia macrorhiza*; lower right, garden-grown *O. humifusa*, the Eastern equivalent. The others are *O. phaeacantha*. Like the middle fruit, prickly pears can be green inside when ripe, or both inside and outside. Photo by Dorde Woodruff.

Spring pads are the ones usually used, although later in the season tougher, older ones may do if skinned. *O. phaeacantha* pads are often quite spiny, and not worth the effort to prepare. I haven't tried them much—one winter pad I skinned was strong tasting.

Although xeriscaping advocates often say, "You don't have to grow cacti", there is nothing wrong with using cacti in xeriscaping, either. *Opuntias* are easy to grow, given constraints of cold-hardiness, with adequate drainage. They don't need humus-rich soil but do need as much sun as possible for good production, and respond well to fertilizer and sufficient water in the growing season.

Growing food plants in your xeriscape garden is a nice, ecologically pleasing concept. If you don't have to be organic, using premergence weedkiller in the late fall is efficient, and some are rated for food crops much closer temporally to the crop than this. Otherwise it's vigilance, tools, and never letting weeds go to seed in your cactus garden. For pads you would want *O. macrorhiza* in the north, and *O. lindheimeri*, the hardiest of the more southern kinds, where it can survive.

Fruits of *Opuntia* are larger as you go south. For a garden in the north, select the largest fruit you can find in Utah (or Colorado or New Mexico), and take a pad of that plant home to grow, subject to cold-hardiness (and legalities, of course). Cacti, especially *Opuntias*, will grow quite a bit north of where they are found in nature. *O. phaeacantha* is hardy in Salt Lake. The plant with the largest fruit in my cactus garden is from Toquerville. Or find a large patch of *O. phaeacantha* somewhere, and visit it for the harvest. Even a small patch of *O. macrorhiza* in a warm, sunny place and fertilized will produce a surprising amount of fruit.

If you need a cactus food fix in an off-season, you can always visit a Mexican market, so much more common in Utah than they once were, which will offer fresh tender nopales, bottled nopalitos, and fresh red, green, or yellow *tunas* of the sweet Indian Figs, *O. ficus-indica*. Or perhaps you will even find the pretty pale-green-and-rose *xoconostles*, sour cactus fruits, used in entirely different ways, in salsas or regional specialties of the high-plateau Mexican states in which they grow.

Botanic verses

by Bill Gray

Invaders and Invadees

Elegant, but fierce, Scotch Thistle,
Your bristles made the Vikings
whistle.

As legend tells it, this is what
Endears the thistle to the Scot.



According to one account some invading Norsemen were tiptoeing barefoot on an unsuspecting Scottish encampment when one of them stepped on a thistle. He seems to have lost his presence of mind, and blew their cover, leading the Scots to rout them and save the day. Since then the thistle has been the Scottish national emblem.

Now the tables are turned, and *Onopordum acanthium* has become the invader in many parts of the US, including Utah. Its name, derived from the Greek, means "spiny plant eaten by donkeys" – witness Eeyore in 'Winnie the Pooh'. That's not quite so crazy when you see the first-year leaves which are not so fierce (inset). As a weed, this is a classic, establishing vigorous patches on ground that resembles that of its native Scotland (and England). This means relatively mesic situations in which cattle like to graze – and hence the ranchers usually side with the Vikings in hating it. There are a few such nasty spots in Salt Lake and Davis Counties, and doubtless elsewhere in the state.

Several other thistles (Canada Thistle, *Cirsium arvense*; Bull Thistle, *Cirsium vulgare*; Musk Thistle, *Carduus nutans*) are similar nuisances. The first of these can be found dominating several very out-of-the-way places in the Wasatch. Somewhat similar in appearance, but even worse in terms of invasiveness, are the Knapweeds and Starthistles (genus *Centaurea*). Monstrous populations of Yellow Starthistle (*Centaurea solstitialis*) and Russian Knapweed (*Centaurea repens*) are choking places along the Wasatch Front. Though not visibly daisy-like, all of these are in the Asteraceae, tribe Cardueae, with narrow tubular flowers beloved of butterflies.

But not all thistles are to be abhorred. We have quite a number of natives - including a few that are considered 'sensitive species' that we need to monitor to be sure they don't inadvertently fall by the wayside. Among our more common natives are Wavyleaf Thistle (*Cirsium undulatum*) and Arizona Thistle (*Cirsium arizonicum*).

Wavyleaf Thistle is widespread throughout the state, with very pale lilac flowers set off against silvery-white leaves, on stems up to 5 feet tall. This past summer as we hiked up a local canyon we came across a splendid patch of about 30 plants on a trailside slope. Sadly, on the way down we found that all had been uprooted and trashed by someone who presumably thought s/he was doing the natural world a favor.



Arizona Thistle occurs in the southern half of the state. Leaves are "wickedly spiny", often with a light covering of hair which sometimes wears off leaving a shiny upper surface. Flower heads are usually a distinctive rich rose in color, long and narrow.



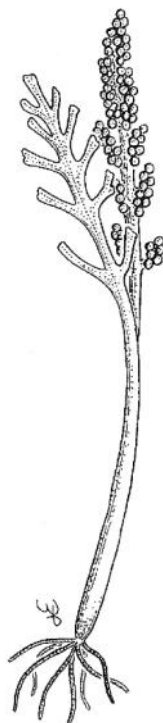
Rare Moonwort Off Candidate List

Endangered Species Act Protection Denied for *Botrychium lineare*

On December 6, 2007, the US Fish and Wildlife Service (USFWS) announced that it was dropping Slender moonwort (*Botrychium lineare*) as a Candidate for potential listing under the Endangered Species Act. In its decision, the Service cited recent studies that have found this diminutive fern to be more widely distributed in North America than originally suspected and under less imminent threat. The removal of Slender moonwort leaves the White River beardtongue (*Pentstemon scariosus* var. *albifluvis*) as the only Utah plant species currently on the official USFWS candidate roster.

Slender moonwort was described as a new species by the late Warren H. Wagner and Florence Wagner in 1994. Wagner and his colleague Don Farrar of Iowa State University have described more than a dozen new *Botrychium* species since the early 1980s, with a few more apparently in the works. Many of these new species are based on subtle differences in leaflet shape, chromosome number, and molecular genetics and individual specimens often cannot be reliably determined. Needless to say, the new taxonomy remains controversial in some camps, though it has been widely accepted among most pteridophyte specialists (and in recent fern treatments, such as *Flora of North America* and *Lellinger's Field Manual of Ferns and Fern-Allies*).

Moonworts are primitive vascular plants closely allied to true ferns but placed in their own family, Ophioglossaceae. Mature moonworts (also called grape-ferns) can be recognized by their single, green, fleshy leaf blades that are divided into two morphologically distinct fronds. The more leaf-like of the two is technically called the trophophore or vegetative frond and functions primarily as a photosynthetic surface. It is paired with the fertile frond (or sporophore) which can be



Above: Slender moonwort (Botrychium lineare) can be recognized by its once-pinnately divided sterile leaf blade (trophophore) with 4-6 pairs of linear and non-overlapping leaflets and its slightly longer, spore case-bearing fertile leaf blade (sporophore) attached above the mid-length of the common leaf stalk. Illustration by Janet Wingate from Colorado Rare Plant Field Guide (Spackman et al. 1997).

recognized by having numerous clusters of tiny, ball-like, spore cases (the "grapes" of the grape-fern). *Botrychium* identification is based largely on differences in the size, shape, and lobing of the vegetative fronds and the point of attachment of the vegetative and fertile segments. Slender moonwort belongs to a subgroup of *Botrychium* species characterized by once-pinnately divided vegetative fronds with linear pinnae (leaflets) and vegetative and fertile fronds joined above the midpoint of their common basal stalk. *B. lineare* would key to *B. lunaria* in *A Utah*

Flora, third edition (Welsh et al. 2003), but can be distinguished by its much narrower, wedge-shaped rather than broadly fan-shaped pinnae.

The sole report of Slender moonwort in Utah is based on an historical collection by Albert O. Garrett (*Garrett 1519 UT*) from a meadow bordering Silver Lake in Big Cottonwood Canyon. Garrett's collection consists mostly of *Botrychium lanceolatum*, but includes a single specimen identified by Wagner as *B. lineare**. The population has not been relocated.

When it was originally described by the Wagners, *B. lineare* was known from just a few widely scattered locations across North America from Idaho and Oregon to New Brunswick and Colorado. The eastern North American populations are now considered a different species (as are previous reports from Idaho, Nevada, and California), but Slender moonwort is presently confirmed from 22 extant occurrences in Alaska, Colorado, Minnesota, Montana, Oregon, South Dakota, Washington, Wyoming, Alberta, and Yukon Territory. Over half of these populations have only been documented since 2003 (including first records for four states), largely because of increased survey effort prompted by the plant's candidate status.

Assessing the conservation status of a cryptic, wide-ranging species like Slender moonwort is a significant challenge. Moonworts can be difficult to locate in the field, and huge areas of potential habitat remain unsurveyed across western North America. Connecting the dots between the most far-flung occurrences, the US Fish and Wildlife Service estimates the total range of *B. lineare* to be over 107,000 square miles. Undiscovered populations could very well occur across such a

* Mixed populations of different *Botrychium* species are not infrequent, and contribute to the rewards of *Botrychium*-hunting (an affliction suffered by many botanists – myself included - who enjoy hands and knees survey of hummocky wetlands).

large area. Unlike most rare plants, this species seems to have fairly unremarkable habitat requirements, being found in a wide variety of wet meadow and forest habitats. The USFWS notes that many of these populations are associated with roadsides and other areas strongly influenced by human activities (including a mine tailings site), suggesting that the species is less threatened than once thought.

The argument for dropping Slender moonwort as a candidate (and with it the chance to be afforded full protection under the Endangered Species Act) presented by the US Fish and Wildlife Service is based largely on the assumption that more populations must be out there, and so the species does not require special attention. Despite the success in locating 12 new populations in the last 5 years, these are all mostly small in area and number, and frequently associated with disturbed areas. Long-term monitoring is still needed to corroborate whether human impacts are neutral (or beneficial) on these occurrences. Twenty-two populations over 107,000 square miles remains a very low population density and the case for dropping the species would be significantly bolstered if many more occurrences had actually been documented. If inter-connecting populations prove not to exist, a majority of the known occurrences would be reproductively isolated and thus incapable of gene flow or augmentation by new spores. Such widely disjunct populations would be more prone to localized extinction events. The seemingly general habitat requirements of the plant may also be an illusion as little is known about its life history, longevity, fecundity, and possible mycorrhizal relationships.

The discovery of new populations and a wider distribution is positive news for the Slender moonwort, but does not make an overwhelming case for changing its candidate status. It is unfortunate that the US Fish and Wildlife Service is not erring on the side of caution and keeping this species as a candidate (at least for a few more years) until better data are available to bolster their decision. With its candidacy re-

moved, other federal agencies are now much less likely to invest staff time and financial resources into surveying and monitoring for the Slender moonwort. In light of recent controversies surrounding decisions by the Bush administration to deny Endangered Species protection to worthy candidates based on shaky science, the US Fish and Wildlife Service could restore public confidence in its integrity by keeping species like the Slender moonwort in the candidate pool until more complete data are available to make a more persuasive and defensible listing decision. —*Walter Fertig*

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Rock Canyon Restoration

By Terri Williams

Provo City once owned a canyon; a rugged, steep-sided canyon so near the city that it seemed part of its heart. For many years, the canyon drew city residents needing a break from the busy world of the everyday - hikers, bikers, families searching for leaves and flowers and Christmas trees. Old folks and young alike stood in silent awe at the base of the rocky cliffs, and geologists taught their classes about the rocks' unusual ages and the pressures that had twisted and bent them.

But the plants in the canyon told their own story - of overgrazing, of the attempts to grow alfalfa and grain in the rocky soil. Weeds introduced from thousands of miles away made their fortunes there, and the heavy human traffic created many interlaced trails and roads over the whole area.

The City parks department knew it could be better than it was - and asked Susan Meyer and Dea

Nelson of the USDAFS, UNPS and Dr. Phil Allen at BYU for help. The result was an unprecedented collaboration of knowledge, ideas, people and energy that changed one small part of the world. Through the labor of thousands of volunteers, the canyon changed so much within five years that it was unrecognizable. Native wildflowers grew there once more, the trails and roads had become useful and manageable and the balance of nature was well on its way to returning completely.

Rock Canyon not only changed, it changed people. It changed me. When I became the Project Manager of the restoration in 2002, I was broken and confused by the events of my life. Working in Rock Canyon helped me focus my mind, strengthen my body and revive my spirit, and it gave me the confidence and faith to face life again. Rock Canyon, to me, is a sacred place - one that brings together many disparate people and energy and ideas and fuses them with the natural world to create a spectacular whole.

Rock Canyon Restoration



Rock Canyon restoration—before (top), during (below), and after (bottom). Photos by Dr. Phil Allen.



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What's In a Name? Fendler, *Fendlera*, and *Fendlerella*

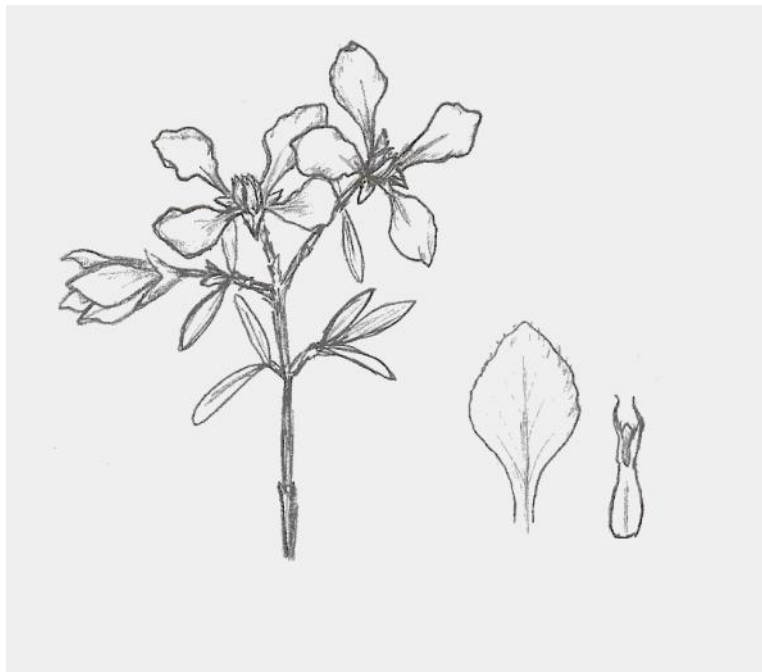
By Walter Fertig

Anyone who has led or participated in a botanical field trip in the western United States cannot help but have heard the name Fendler applied to a trailside plant – either as a common name or in a scientific epithet. But just who was this Fendler, and why do so many plants bear his moniker?

Augustus Fendler was born in eastern Prussia in 1813 and emigrated penniless to the United States in 1836. After many years of menial jobs and rootless travel, Fendler settled in St. Louis and came under the influence of George Engelmann*. A fellow German émigré, Engelmann was already a leading authority on the flora of western North America and mentored a number of young plant collectors, including Karl Geyer, Frederick Wislizenius, and Charles Parry. In 1846 Engelmann took advantage of the Mexican-American war to arrange for Fendler and a mound of collecting supplies to be transported along with American troops to Santa Fe. Fendler spent the next year collecting across northern New Mexico and returned to St. Louis with over 1000 herbarium specimens.

Engelmann and his colleague, Asa Gray of Harvard University, were especially pleased with the quality and variety of Fendler's collections. Ultimately, over 400 new species were described from Fendler's haul, many of which have withstood the test of time. Nearly 40 plants from the southwest and Rocky Mountain region still bear his name, including species of *Arabis*, *Arenaria*, *Argyroschisma* (a fern), *Berberis*, *Brachythecium* (a moss), *Ceanothus*, *Cryptantha*, *Echinocereus*, *Hydrophyllum*, *Lesquerella*,

*Engelmann helped establish the Missouri Botanical Garden, saved the French wine industry, and also had numerous plants named for himself (most notably the Engelmann spruce), but we will save his story for another time.



Above: The Latin name of Cliff fendler-bush (*Fendlera rupicola*) translates as “rock-lover *Fendlera*”. A good place to see this plant among the rocks it loves is on the red sandstone cliffs at the mouth of Courthouse Wash in Arches National Park. Illustration by W. Fertig.

Penstemon, *Poa*, *Senecio*, *Sphaeralcea*, and *Thalictrum*.

Fendler was also commemorated by not one, but two, genus names. *Fendlera* (known in English as fendler-bush) was named by Engelmann and Gray for 2-3 shrub species in the Hydrangea family (Hydrangeaceae)** from the southwestern United States and Mexico. Members of this genus are somewhat unusual in having just four petals (most flowering shrubs have 5). The petals have finely and irregularly toothed, diamond-shaped blades and taper to a slender base called a claw (somewhat comparable in appear-

ance to the narrow petiole of a leaf). The most peculiar trait of the *Fendlera* flower, though, is the appearance of the 8 petal-like stamens which are broad and flattened at the base and forked like the tongue of a snake behind the anther sac. The stamens form a ring that obscures the ovary, at least until it ripens into a mature capsule.

One *Fendlera* species, *F. rupicola* or Cliff fendler-bush, is known from southeastern Utah in Wayne, Grand, and San Juan counties. Some taxonomists split this species into 2-3 varieties based on differences in leaf size, shape, and degree of pubescence. Our plants tend to have slender, moderately hairy leaves of var. *falcata* (a.k.a. *Fendlera falcata*). This is the most widespread form, ranging from southern Nevada to southwestern Colorado and west Texas. To the east and south of Utah, plants with inrolled leaf margins and densely white-

**Traditionally, this family has been included within the Saxifragaceae (where it is treated by Welsh et al. in *A Utah Flora*). Members of the Hydrangea family are woody shrubs with ovaries comprised of 3-5 fused carpels, while plants in the Saxifrage family (in the strict sense) are herbaceous with ovaries of 2 carpels fused only at the base.

tomentose undersides belong to var. *wrightii* (in the strict sense, var. *rupicola* is a narrow Texas endemic). Leaf characters intergrade across the species' range, however, leading some authorities to lump all three forms under one name.

Cliff fendler-bush makes an attractive addition to a natural garden. The white flowers are relatively large as shrubs go (about 3/8 to 3/4 of an inch) and occur singly or in clusters of 2-3 at the end of a branch. Flowering takes place from April to June, with a second bloom sometimes occurring in late summer. *Fendlera* can grow in full sun and is drought and heat tolerant. Although its natural range is the canyon country of the Colorado Plateau, it can be hardy as far north as the valleys of northern Utah, southern Idaho, and eastern Washington. Fendler-bush can grow from seed (available commercially) that is stratified at refrigerator temperatures for 60-90 days, or from greenwood cuttings.

Native Americans put *Fendlera* to many uses. Navajos made an infusion from the inner bark as a medicine to treat poisons. Boiled with juniper bark, pinyon buds, and corn meal, the resulting mush was also used in certain ceremonies. Many tribes used fendlerbush wood to make arrow shafts, knitting needles, planting sticks, and weaving forks.

The second genus named for Fendler is *Fendlerella*, or literally the "little *Fendlera*". Amos Heller coined this name for another small genus of southwestern shrubs in the Hydrangea family. Species of *Fendlerella* differ from *Fendlera* in their smaller stature, small 5-petaled flowers arranged in a cyme-like inflorescence, and stamens that taper abruptly from a broad base to a cap-like anther. Only one species occurs in Utah, the aptly named *Fendlerella utahensis* (Yerba desierto or Utah fendlerella). The type specimen of this taxon was collected by Ellen Powell Thompson (pioneer botanist of southern Utah and sister of explorer John Wesley Powell) in 1872, supposedly from Kanab. No one has been able to relocate this species since in Kane County, leading Dr. Stan Welsh to suggest that the original specimen

was actually collected farther to the east (location data were notoriously imprecise in those early days). Utah fendlerella occurs sporadically across the state (Garfield, Millard, San Juan, Uintah, Utah, Washington, and Wayne counties), especially in limey sandstone cliffs, but is not commonly used in cultivation.

Fendler followed up his successful 1846-47 New Mexico trip with a major expedition to the poorly explored Great Basin in 1849. Not long into the trip Fendler lost all of his gear, notebooks, and specimens in a flood. Returning to St. Louis, he found that his home and possessions had all been destroyed in a fire while he was gone.

Augustus Fendler left the west for good after this run of misfortune, though he would resume plant collecting in the southeastern US, Panama, Trinidad, and Venezuela. He died in 1883 and was eulogized by Asa Gray as a "quick and keen observer and an admirable collector".

References:

Dorn, R.D. and J.L. Dorn. 2007. *Growing Native Plants of the Rocky Mountain Area*. Self-published. 252 pp.

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Botanical Arts and Crafts

How to Make a Cocklebur Poodle

By Walter Fertig

Late summer and fall is a time when hikers become painfully aware of the great number of plant species that produce fruits with spines, hooks, or other protuberances designed to catch a ride on our pant legs, socks, and shoe laces. Mother Nature originally developed these structures to aid in the dispersal of seeds and fruits to new habitats for germination. It is only recently that a new use has been developed for these devilish devices: the modeling of small, poodle-like dogs!

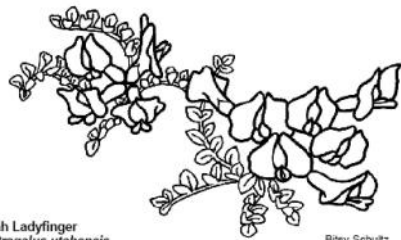
According to Wayne Armstrong, a botanist at Palomar College in California, the fruits of Cocklebur (*Xanthium strumarium*) can be fashioned into a reasonable facsimile of a standard poodle. Sixteen fruits are required (one for the face and "topknot", two for the ears, one for the neck, two for the body, one for the tail, and two each for the legs). The slender, hooked bristles on the fruit help secure the parts together, although I have found that a little white Elmer's glue also helps if you wish to keep your poodle for posterity.



Above: Cocklebur poodle, made of 16 fruits of *Xanthium strumarium*. Perfect for Christmas! Illustration by W. Fertig.

Other bristly fruits may be substituted with varying degrees of success. I have found that the fruits of licorice-root (*Glycyrrhiza lepidota*) will also yield a poodle. However, the fruits of burdock (*Arctium minus*) produce an animal that looks more like a cross between a woolly-bear caterpillar and a slightly demented grizzly bear.

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