Sego Lily
Newsletter of the Utah Native Plant Society

Above: "Intoxicated" hawkmoth, tentatively identified as Sphinx perelegans*, on bloom of* Datura wrightii. *Photo by D.N. Reynolds.*

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In this issue:

Datura and Hawkmoths: An Intoxicating Relationship

By Douglas N. Reynolds

Datura wrightii is the only member of its genus native to Utah where it naturally occurs in many of our southern counties. For three years I have been raising a plant, bought at a nursery, outside my cabin west of Cedar City in Iron County, a little above and beyond its natural range. Finally, as the summer of 2008 arrived, the plant took off, growing four feet across with more than 50 developing flower buds. A few feet away in my garden from a large Desert Four O'clock, *Mirabilis multiflora*, I looked forward to having a major hawkmoth attraction as summer evenings approached.

One morning after the plant had begun to bloom, I noticed a motionless hawkmoth embedded deep within a *Datura* corolla, hours after it would usually have flown away. I thought he must have died and fished him out of the flower to take a look. I was surprised when he moved a little bit and I lay him on the edge of the bloom, took a photo, and was glad to see that he had left a few hours later.

That afternoon I sent the photo to a botanist friend in Seattle. Knowing about the hallucinogenic effects of *Datura* on humans, I made a joke about my "stoned" hawkmoth. I was surprised when my friend responded with a few internet links which indicated that I was not the first to suspect an effect of *Datura* nectar on hawkmoth behavior.

The basic story reported by a number of websites on the internet is that the moths become "Jimsonweed Junkies", addicted to hallucinogenic alkaloids such as atropine, hyoscyamine, and scopolamine in the [continued on page 6]

Utah Native Plant Society

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 -0041 or email unps@unps.org

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

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Chapter News

Fremont (Richfield Area): At the end of this productive year for the Fremont Chapter, we look back at plantings, lectures, fund raising, and public awareness events. We are especially pleased at the xeric plantings we established on the Sevier County Administration Building grounds at the request of our Sevier County Commissioners. We also are pleased with the progress of the garden at Sam Stowe Campground in Fremont State Park. We spent many hours through the summer planting, raking and weeding. In late October we planted wildflower seeds we had gathered. We welcome you all to visit the site--just check in a Park Headquarters before going to the Campground area.

Our latest project is a Celebrate the Wild Calendar for 2009, featuring exquisite photos by chapter members. Sidebars accompany each photo with educational and engaging information contributed by Chapter members. Each month features a different theme, such as Penstemons, Native Seeds, Pollinators, etc. We are still accepting additional sponsors, if anyone is interested in participating, Please contact janett@wildlandnursery.com to order. The calendar will be available the first week in January for approximately $10.00. It's a lovely gift for yourself or a friend. Contact me at jbnielson@sisna.com to place an order. - *Janet Nielson*

Manzanita (Kane Co.): We are currently planning our spring events. In January (date to be announced) we will hold our first "herbarium night" event. Trained glue monkeys will provide hands-on instruction in the proper mounting of herbarium specimens and we will help the Grand Staircase-Escalante NM herbarium get caught up on its backlog of unprocessed specimens. In February, we are planning our second annual propagation workshop at the Best Friends Greenhouse. Bill Gray has also volunteered to give his SW Australia slideshow at some point this winter or spring (see details below). By April we hope to be back outside with a fieldtrip to the Mohave Desert near Mesquite, NV.—*W. Fertig*

Salt Lake: On Friday, January 16 at 7PM at the Sugarhouse Garden Center we are having a joint meeting with the Wasatch Rock Garden Society. Bill Gray will present "Southwest Australia: a Botanical Wonderland". The state of Western Australia has about 9000 species of plants, with a large proportion of them found nowhere else on earth. They are especially concentrated in the SW corner, which is similar in size and climate to southern California. The diversity and level of endemism there is so high that botanists honor it as the

Southwest Australia Botanical Province. Come and be introduced to some of these truly wonderful plants and learn something of the challenges they face in competition with man in all his shortsightedness. — *Bill Gray*

Southern (Washington Co.): Rick Heflebower, county horticulture extension agent, will lead a tree pruning workshop on Saturday, January 10 at 10:30 AM at 50 Bridge Street in Rockville. The workshop is free and open to the public.—*Barbara Farnsworth*.

Bulletin Board

Life member update: Patricia McQueary of St. George became our 33rd lifetime member in December 2008. Thank you Patricia! - *Tony Frates*

5th Southwest Rare Plant Conference—March 16-20, 2009.

The Utah Native Plant Society is pleased to be sponsoring the 5th Southwest Regional Rare Plant Conference focusing on "Changing Landscapes in the Southwest" at the University of Utah the week of March 16-20, 2009. Deadline for submitting abstracts for oral presentations or posters has been extended to January 8, 2009, but the agenda is filling up quickly. As of late November, the following speakers have committed to coming:

Noel Holmgren, curator emeritus of the New York Botanical Garden: Biogeography of the Intermountain Region

Bob Sivinski, New Mexico Rare Plant Program: Southwestern Cienegas: Rare Habitats for Endangered Wetland Plants

Susan Meyer, USFS Shrub Lab: The Role of Seed Bank Studies in Elucidating the Population Biology of Rare Plants

Above: Kaiparowits milkvetch (Astragalus malacoides) *by Kaye Thorne.*

Rob Gillies, Utah Climate Center: Climate Change and its Potential Effects on the Southwestern USA

Carol Spurrier, BLM Washington DC office: National Landscape Conservation System Lands and their Importance to Preservation of Rare Plants in the West

John Spence, Glen Canyon NRA: G1-G2 Plants of the American Southwest: A Looming Crisis

John Anderson, BLM Arizona State Office: East Meets West: Rare Desert *Allium*s in Arizona and California

Mitch Power, University of Utah: Paleoecology and Ecosystem Management: A Long-term Perspective on Plant Communities in the Southwest USA

Doug Ramsey, Utah State University: GAP Analysis and its Uses for Rare Plant Preservation

Walter Fertig & Doug Reynolds, Moenave Botanical Consulting: Cedar Breaks National Monument: A Mini-Hotspot of Vascular Plant Endemism

Steve Caicco, USFWS Nevada state office: Vulnerability of the Rarest Plants in the Great Basin of Nevada to Climate Change

Mark Miller, USGS: Post fire monitoring of the Milford Flat Fire

Renee Van Buren, Utah Valley University: Genetics of *Astragalus ampullarioides*

Amy Croft, Utah State University: Predictive Models for Rare Plant Habitat

Crystal Krause, Northern Arizona University: Spatial Patterns of Endemic Plant Species of the Colorado Plateau

Debra Crisp & Barbara Phillips, Coconino, Kaibab, and Prescott National Forests: Arizona cliffrose, an Arizona Endemic.

On Thursday, March 20, there will be a breakout session for Utah botanists and others to review the state list of G1-G2/T1-T2 and other rare plant taxa coordinated by Ben Franklin and Walter Fertig. This session will be a first cut at developing a new UNPS state rare plant list.

A field trip to Stansbury Island is scheduled for Friday, March 21 for those wishing to see some early spring flora, northern Utah style.

Early registration for the conference ends 13 February 2009 and costs $150. After this date, late registration is $200. Participants can also sign up for individual days. Discounts are available for full time students.

For more information on the conference, lodging, transportation, or to register or submit an abstract, go to the conference link through the UNPS website (www.unps.org) or contact Mindy Wheeler (wheelermindy @yahoo.com).

UNPS Annual Members Meeting, November 7th 2008

Almost 50 people attended the Thirtieth Anniversary Celebration and annual members meeting held at the Sugarhouse Garden Center. We had the traditional "New World Potluck" dinner centered around turkey, potatoes, yams, cranberries, tomatoes and other goodies. Dorde Woodruff made one of her renowned cactus dishes which was greatly relished. Ann Kelsey provided table decorations from the local foothills, along with questions about their identities.

While members were polishing their plates Bill Gray introduced some of the special guests who had been able to come. Dick Hildreth, one of the driving forces behind the creation of UNPS was here, and subsequently spoke about the earliest days of the organization. One of the original board members was the late Arthur Holmgren: we were delighted to have with us life members Noel and Patricia Holmgren who have almost completed the monumental *Intermountain Flora* during their tenure at the New York Botanical Garden. Other attendees included Dave Gardner, creator of the wonderful UNPS Wildflower Posters, and Jo Stolhand who filled many roles during her long active leadership role.

Duane Atwood, the first president of UNPS, was scheduled to be the main speaker, but unfortunately had to cancel because of illness in his family. By luck Tony Frates had a copy on his laptop of the presentation that Duane had given at the most recent Utah Rare Plant Conference, and was able to recreate it for us. A great addition to the talk was Tony's account of the rediscovery of Beckwith's Violet (*Viola beckwithii*) in the natural area of Red Butte Garden by Faye Rutishauser, one of RBG's staff members. The last person to report seeing this beautiful plant in Salt Lake County was Walter Cottam in the 1950s. We are inspired to redouble our efforts to find other occurrences next Spring.

Tony's rescue of the occasion was only the latest of innumerable things he has done for the Society, spanning almost our entire history. He became our third President in 1982 (that must be the youngest ever!) and has worked tirelessly on behalf of rare and threatened plants. Earlier this year the Board of Directors voted to present him with our highest honor, a UNPS Lifetime Achievement award. Previous recipients have been Dick Hildreth, Susan Meyer and Duane Atwood. In making the presentation Bill King recounted their first phone conversation when Tony, who had taken a 'leave of absence' for a few years, offered to volunteer some time to UNPS: out of this came our vastly improved website which he has nurtured ever since. Bill went on to relate some of the more recent history.

Above: UNPS' version of the "Tony Award" - the lifetime achievement award—is presented to Tony Frates (left) by UNPS President Bill King at the 2008 annual meeting. Photo by Dave Wallace.

Larry Meyer conducted a short business meeting at which members were asked to vote on a slate of candidates for the 2009 Board of Directors. No nominations were proposed from the floor, and the following received unanimous approval: Walter Fertig (Manzanita), Robert and Susan Fitts (Utah Valley), Bill Gray (Salt Lake), Marie Griffiths (Salt Lake), Ty Harrison (Salt Lake), Charlene Homan (Salt Lake), Celeste Kennard (Utah Valley), Bill King (Salt Lake), Kipp Lee (Salt Lake), Margaret Malm (Southern), Larry and Therese Meyer (Salt Lake), Jeff Mitchell (Utah Valley), Leila Shultz (Cache), Dave Wallace (Cache), Mindy Wheeler (Mountain), Maggie Wolf (Salt Lake), and Loreen Woolstenhulme (Utah Valley).

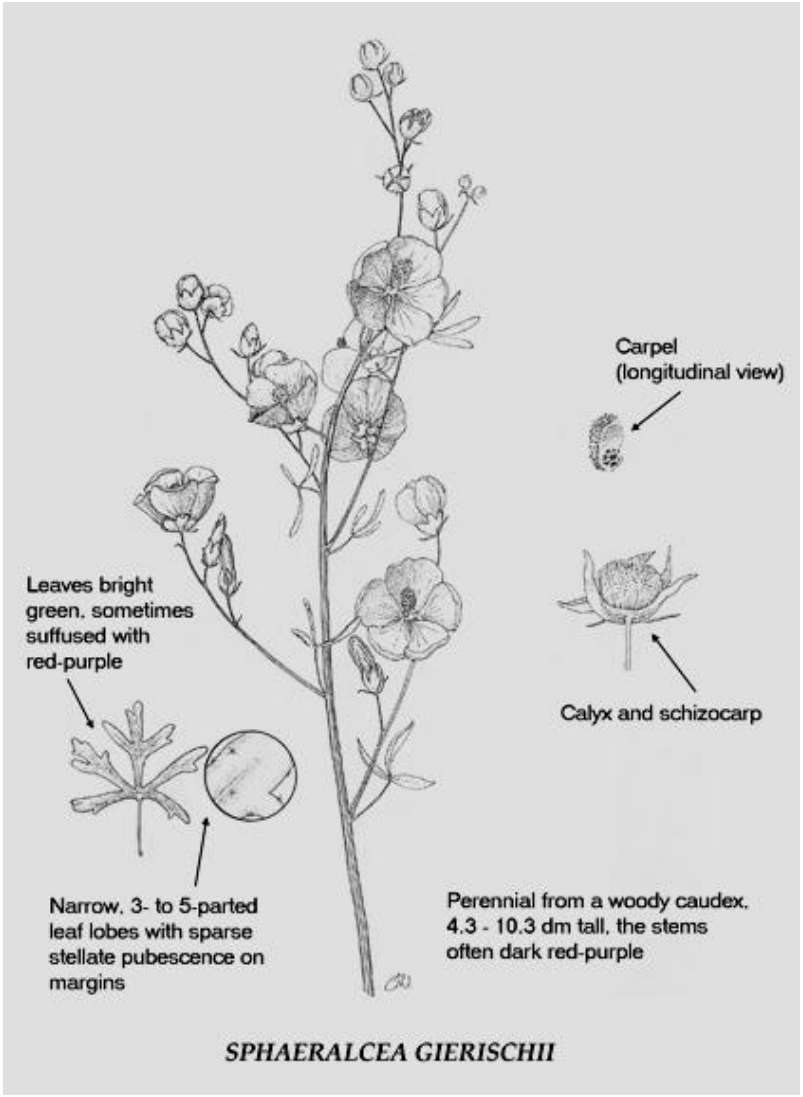
The new board will meet later to elect officers for the coming year. - *Bill Gray*

USFWS Gives Gierisch's Globemallow Candidate Status

On 11 December 2008, Utah's roster of plant species being considered for potential listing under the Endangered Species Act increased by one when the US Fish and Wildlife Service afforded official Candidate status to Gierisch's globemallow (*Sphaeralcea gierischii*). This tall, orange-flowered perennial herb in the mallow family (Malvaceae) is known from less than 60 acres of habitat along the Utah-Arizona border in Washington and Mohave counties where it is restricted to semi-barren outcrops of gypsum-rich soils derived from the Harrisburg Member of the Kaibab Formation. Two small populations are found south of St. George and half a dozen sites occur in northern Arizona, including one at the edge of an active gypsum mine. Other populations are being impacted by urban sprawl, competition from exotic annual weeds, and off-highway vehicle recreation.

Gierisch's globemallow was described as a new species by Duane Atwood and Stan Welsh in 2002. *S. gierischii* resembles Rusby's globemallow (*S. rusbyi*) and Moore's globemallow (*S. moorei*) in having nearly glabrous and deeply cleft leaves but can be distinguished by its larger flowers and glabrous calyx. The species name commemorates Ralph Gierisch, a long-time BLM botanist (now deceased) who first collected the species in 1978 and made numerous other important plant discoveries in the Colorado Plateau and Arizona Strip.

Each year the US Fish and Wildlife Service revises its list of candidate species. Although not formally listed as Threatened or Endangered (and thus not legally protected), candidates are species that the Service recognizes as qualifying for listing in the future as funding and priorities permit. Usually candidate species are managed as if they were already listed by other federal land management agencies (either formally as Sensitive species or informally by policy) to prevent any adverse actions from pushing the species towards listing under the Endangered Species Act.



*Above: Gierisch's globemallow (*Sphaeralcea gierischii*) from the digital version of the Utah Rare Plant Field Guide (www.utahrareplants.org). Illusration by Shannon Workman.*

Currently the only other Utah plant on the Candidate list is the White River beardtongue (*Penstemon scariosus* var. *albifluvis*) of the Uintah Basin which has been in candidate limbo for over 20 years. Since 2006, five other plant species have been dropped from the proposed or candidate lists: Horseshoe milkvetch (*Astragalus esquisolensis*), Slender moonwort (*Botrychium lineare*), Aquarius paintbrush (*Castilleja aquariensis*), Rabbit Valley gilia (*Gilia* [*Aliciella*] *caespitosa*), and Graham's beardtongue (*Penstemon grahamii*). Utah currently has 24 plant species on the Endangered Species List, although Maguire's daisy (*Erigeron maguirei*) has been recently proposed for de-listing.

The US Fish and Wildlife Service is seeking additional information on the distribution, abundance, life history, and threats to Gierisch's globemallow. - *Walter Fertig*

Datura and Hawkmoths: An Intoxicating Relationship [continued from page 1]

nectar. They cite observations that the moths arrive before the flowers open, and, instead of hovering to obtain the nectar as they usually do, they dive into the corolla, beat their wings and become covered with pollen. The authors imply that the alkaloids in the nectar addict the moths, and suggest that this is an adaptation by the plant to increase pollination. The reasoning is that if the moths come to *Datura* blossoms preferentially over those of other species because of the addictive compounds and spend more time in them, more frequent and effective pollination may occur.

All this speculation seems to come from a single scientific article published in 1983 by noted botanists Verne and Karen Grant. They observed hawkmoths of the species *Manduca quinquemaculata* to act "intoxicated" after visiting *Datura* blooms. The moths were seen to move erratically and awkwardly, missing their targets, and falling to the ground. Perhaps my hawkmoth was just sleeping it off when I found him that morning. Other reports on the internet state that hummingbirds act strangely, fluffing their feathers and remaining motionless for several hours after feeding on *Datura* blossoms.

While the story of a plant using drugs to addict its pollinators is intriguing, my scientific skepticism leads to a few questions that need answers before accepting the entire account. First, I can find no report that the hallucinogenic alkaloids, known from other parts of the plant, actually occur in *Datura* nectar. I did find an account that several compounds with "potential narcotic properties" have been found in the nectar of an orchid, *Epipactis helleborine*, in Europe. The authors of this study also propose that alcohol, produced from fermentation of the nectar by wild yeast, might also affect insect behavior. Second, I don't know enough about physiology of insects to know how alkaloids might affect them or if they can become addicted. There certainly are well-documented effects of *Datura* secondary compounds on humans.

Above: Datura wrightii *growing at 6000 ft. elevation in central Iron County. Photo by D.N. Reynolds.*

For centuries and on every continent except Antarctica, people have used various species of *Datura* for prophetic trances, initiation ceremonies, aphrodisiacs, and induction of stupors in wives and slaves before being buried alive with their dead husbands. My favorite is the use by women in the East Indies who fed *Datura* leaves to beetles and then sprinkled their feces on food to poison unfaithful lovers. Lest any of these uses pique the curiosity of readers, be aware that there are many reports of toxicity from *Datura* ingestion . The concentration of the active compounds varies widely between plant parts and from the conditions under which the plant grew, and there is no way to know beforehand what kind of a dose, mild or toxic, one may receive. Ingestion of various *Datura* parts is known to cause convulsions, blindness, respiratory depression, and death.

Nevertheless, the story of *Datura* and hawkmoths is intriguing and, if true, it represents another way for plants to manipulate their pollinators besides just providing a food reward. But we shouldn't automatically extrapolate human effects of the drugs to insects or impute a selective advantage to the plant without more evidence. Perhaps the narcotic compounds evolved to protect vegetative parts of the plant from herbivory and some just ended up in the nectar (if they're actually even there). Perhaps the presence of the compounds in the nectar actually has a negative effect on pollination; the "intoxication" and loss of control may actually decrease the pollination effectiveness if the moths don't travel to as many flowers or if they waste time sleeping off the effects rather than transferring pollen. In any case the story is the kind I liked to use to impress my Introductory Botany students that plants are more sophisticated than they might think and that, even without brains, plants can manipulate animals as much as animals take advantage of plants.

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Botanica

When Biocontrol Goes Bad: Introduced Flies Increase Impact of Invasive Plants

Biocontrol agents, such as insects, are often released outside of their native ranges to control invasive plants. But scientists in Montana have found that through complex community interactions among deer mice, native plants and seeds, the presence of an introduced fly may exacerbate the effects of the invasive plant it was meant to control. These results are published in the September 2008 issue of the journal *Ecological Applications* published by the Ecological Society of America.

Spotted knapweed (*Centaurea maculosa*), a flowering plant native to Eurasia, was first discovered in the United States in the late 1800s. This broad-leaved plant has an advantage over native plants because its natural enemies, including insects such as European gallflies, do not naturally exist in North America. Thought to have hitched a ride with hauls of alfalfa, knapweed is now widespread in western North America and has become a serious problem in the U.S. across Washington, Idaho, Wyoming and Montana and in Canada across Alberta and British Columbia.

As early as 1971, U.S. scientists began releasing gallflies in an effort to reduce populations of the invasive weed. Like all biocontrol agents, the gallflies were selected because of their specificity to their host plant, leaving little risk of direct harm to other plants.

Adult flies lay their eggs in the weed's flowers, and after the larvae hatch they induce the plant to grow tissue around the insect, encasing it and isolating it from the rest of the plant.

"The woody galls wall off the fly larvae from within the flower head," says Dean Pearson, lead author on the study and a research ecologist with the U.S.D.A. Forest Service's Rocky Mountain Research station. "The larvae then overwinter in the seed heads for about nine months. When the plant devotes all that extra energy to producing these galls, it has less energy to produce seeds."

Scientists and managers expected that this seed deficiency would lead to limited knapweed population growth. An unanticipated side effect, however, involves the flies' furry neighbors. At the foot of the Sapphire Mountains in western Montana, omnivorous deer mice, whose diet usually consists of native seeds and insects, have also begun to prey on the introduced gallflies.

"These mice are generalists and very effective at exploiting a new resource," says Pearson. "They can tell which seed heads have the most larvae inside them, and that makes them very efficient." Pearson says that an average mouse can process 1200 larvae in one night. "A super mouse could go through a whole lot more than that," he adds.

*Above: Spotted knapweed (*Centaurea maculosa*) by W. Fertig.*

At Pearson's grassland study site, spotted knapweed makes up more than half of the plant ground cover. The abundance of knapweed leads to lots of gallfly larvae, which serve as a food subsidy for the mice. Pearson and his coauthor, Ragan Callaway of the University of Montana, found that this extra nourishment bolsters mouse population size, increasing the numbers of hungry mice feeding on their original source of food: the seeds of native plants. As mouse consumption of native plant seeds increases, fewer native plants survive past the seed stage.

Pearson says that this exacerbation of the invasive species' impact has a lot to do with the effectiveness of the fly at controlling the knapweed.

"If the biocontrol agent is really effective, then it will eventually eat itself out of house and home, and the community interactions become less of an issue," Pearson says. He points out that even if the fly decimates 80 percent of the knapweed population, the 20 percent of seeds that are left to germinate are often enough to outcompete native plants.

The authors make the case that although biocontrol agents are carefully selected for specificity to their host plants, these restrictions do not prevent them from drastically altering the community food web, which can have far-reaching repercussions. Pearson hopes that a better understanding of food web ecology will lead to more effective tools for invasion control.

"Everything's interconnected," says Pearson. "We need to understand the ecology. If we can understand these complexities, we can attempt to minimize the side effects and maximize the effectiveness of our tools." - *Christine Buckley and Nadine Lymn*

Utah Plant Families: The Sumac Family (Anacardiaceae)

By Walter Fertig

Every family has its black sheep, and for the Anacardiaceae that distinction clearly belongs to poison ivy and its close relatives in the genus *Toxicodendron*. As young children we learn "leaves of three, let it be" to remind us to avoid the shiny green foliage of poison ivy and its itchy consequences (though technically the "leaves of three" are actually three leaflets of a single, compound leaf). Poison ivy's toxicity comes from the chemical compound urushiol which can cause painful swelling, itching, blisters, and a rash in infected people. Urushiol (or $C_{21}H_{32}O_2$ for those who enjoy a good chemical formula) is found in all parts of the plant but is especially abundant where sap is present. Touching or merely brushing against poison ivy (or coming into contact with contaminated clothing or pet fur) is sufficient for a reaction. Some of the worst cases of poison ivy come from inhalation of smoke from burned *Toxicodendron* plants.

Some people are less susceptible to poison ivy infection than others, though few are truly immune. Historical records suggest that Native Americans purposefully ingested fresh springtime leaves of poison ivy to develop immunity. More recent clinical trials show very limited success with self hyposensitization. Despite some anecdotal reports to the contrary, there is little inherent difference in susceptibility to poison ivy between or among human races.

Numerous folk remedies have been proposed for curing poison ivy, ranging from extracts of gumweed (*Grindelia* spp.), to Epsom salts and lead acetate (not recommended these days for the risk from lead poisoning). Greasy ointments applied to infected skin is an especially bad cure as these are more likely to spread infection than cure it. Prevention remains the best remedy. Thorough washing of skin and clothing in several changes of water works well, though individuals should take care to avoid any hard scrubbing of infected skin that may create lesions and new points of infection.

Above: Western poison ivy (Toxicodendron rydbergii*) is a low-growing shrub rather than a vine, like its relative* T. radicans *from the eastern US and Canada. The three leaflets comprising a single leaf are wavy margined to irregularly toothed, veiny, and often shiny and turn bright red in the fall. Fruits are whitish berries and are relished by wildlife. Illustration by W. Fertig.*

Interestingly, relatively few animals are susceptible to poison ivy and many game species, rodents, livestock and birds consume the foliage and fruits without ill effect.

Chemical compounds are a hallmark of the Anacardiaceae and occur commonly in foliage, stems, and fruits in a system of resin ducts. The family is also defined by a set of technical floral and fruit features. Most members of the family have small, greenish-white flowers consisting of five fused sepals, five separate petals, and 5-10 stamens inserted on a fleshy nectar disk or torus. The ovary is superior and consists of 1-5 fused carpels. Fruits are usually a one-seeded drupe with a fleshy coating surrounding a hardened seed (much like a peach).

The Anacardiaceae is mostly a tropical family of trees and shrubs, though a small number of species are native to temperate and desert regions of North America and Eurasia. Experts recognize 60-77 genera worldwide, of which just two are native to Utah. Several genera are economically important as a source of resins, edible fruits, or are grown as ornamentals. Mango (*Mangifera indica*), native to Southeast Asia, has been cultivated for 4000 years as a source of fleshy, edible fruits. Unlike most members of the family, Mango has simple rather than pinnately compound or three-parted leaves. Cashews (*Anacardium occidentale*) are native to the New World tropics but are now widely cultivated in India. The cashew "nut" is actually an appendage formed at the tip of the pear-like fleshy fruit. Another popular "nut" in the family is the pistachio (*Pistacia vera* and related species), which has been excavated from archaeological sites dating back 6760 years. Technically, the

edible nut is actually the seed and the shell is the hardened endocarp of the fruit. Three pistachio species are grown in the St. George area, with the Atlas pistachio (*P. atlantica*) occasionally escaping.

The largest genus in the Anacardiaceae native to Utah is *Rhus*—the sumacs. The malodorous Skunkbush or Squawbush (*Rhus aromatica* or *R. trilobata*) is our most ubiquitous species, This species comes in two forms distinguished by leaf and habitat features. The typical form (var. *trilobata*) has leaves divided into three wedge-shaped leaflets and frequently occurs in wet habitats or canyons. Variety *simplicifolia* with simple (undivided) leaves occurs on rimrock ledges and slopes in the Colorado Plateau region of the state. Both varieties produce small clusters of yellowish-brown flowers in early spring (often before the leaves mature) which are later replaced by reddish-orange round fruits covered with sticky hairs. The little drupes have a pleasant lemon-like flavor and make a nice snack along the trail for humans an animals alike. Native Americans also used the young, pliable stems to construct durable woven baskets.

Smooth sumac (*R. glabra*) differs from Skunkbush in having a denser and more elongate inflorescence and longer, pinnately compound leaves. It is less abundant in Utah where it occurs mostly in canyons, streamsides, or mountain shrub communities. Both sumacs can be propagated from seed or root cuttings and are adaptable in a variety of soils. Skunkbush seeds require cold treatment to break dormancy and so are best planted in the Fall.

In the past taxonomists have included poison ivy in the genus *Rhus*. Though clearly related, the poison ivies (*Toxicodendron*) can be distinguished by their non-glandular white fruits. Utah has a single member of the genus, *T. rydbergii* named for Per Axel Rydberg of the New York Botanical Garden who discovered many western plants nearly a century ago. Rydberg was well-respected by his colleagues and so it seems unlikely that being commemorated by a poison ivy was meant as a slur!

The genus name *Toxicodendron* has an interesting etymology of its own. Translated from Latin, toxico-dendron means toxic wood. In Greek, however, toxico means "bow". Early bow hunters frequently dispatched their prey by using poison on their arrows, and so the term toxic bow is an accurate description of their hunting method.

Poison ivy has a rich ethnobotanical history as a source of food, medicine, and dyes by Native American and pioneer settlers. Recently, some of these uses were put to the test by Dr. David Senchina of Iowa State University. Senchina found that poison ivy makes an effective textile dye (though it bleeds in washing). Laboratory tests show that chemicals from poison ivy have anti-inflammatory and anti-oxidant activity and may show promise for treating rheumatism or sciatica. Senchina found little evidence that Rhus tox, a homeopathic preparation used for a variety of ailments, had any effects beyond being a mild placebo. He found even less evidence that poison ivy was widely used as a source of human food because of all the likely side-effects from its toxicity.

Poison ivy sufferers may be even more dismayed by recent research by Dr. Jacqueline Mohan and colleagues from Duke University who investigated the potential effects of enhanced levels of CO_2 (predicted by climate change models) on the growth of the eastern species, *T. radicans*. These researchers found that poison ivy grows faster under increased CO_2 and produces significantly more unsaturated urushiol—the form of the toxic compound that is most virulent to people. The team concluded that poison ivy will be more widespread, more aggressive, and more toxic in the projected warmer world of the near future!

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*Below: Smooth sumac (*Rhus glabra*) by W. Fertig.*

Botanical Volunteers Needed

UNPS volunteers are needed in the summer of 2009 for research projects in Utah's three Colorado Plateau national forests: the Dixie, Fishlake, and Manti-La Sal. For two years now, Grand Canyon Trust has been poking around on these forests, looking for "gold standard" reference examples of seven habitats that too often are over-used: riparian, meadow, spring, aspen, ponderosa pine, and sagebrush communities, and beaver complexes.

We've located over a dozen sites that due to one circumstance or another (and usually because they are not heavily grazed by livestock) are in much better shape than most places elsewhere on the forests. We are in productive conversations with the three forests' supervisors about committing to maintain these sites' good condition. Until now, the forests' managers have not been using reference sites to understand impacts or guide restoration on their forests in these habitat types.

During Summer 2009, we will be extraordinarily grateful if pairs of UNPS volunteers would choose one or two of these sites, and spend 1-2 days identifying and listing the plant species on their "adopted" site. Trust staff will assist with logistics, meals, and field tasks (e.g., helping photograph the plants). Bill Gray and Dave Gardner can attest to the good meals of intern Season Martin when Bill and Dave launched UNPS help on this project in 2008 at an interesting potholes spring-fed meadow of Fishlake NF. And the good news is that now Season has joined the Trust as our Utah Volunteer Coordinator!

Your field visit and plant identification will help the Trust demonstrate the nature of reference areas and the need to use these sites to restore diversity, beauty, and habitat conditions throughout these forests. For more information about the Reference Areas Project, see http://www.grandcanyontrust.org/programs/forests/utah/reference_areas.php on the Grand Canyon Trust website (www.grandcanyontrust.org). By February we will have the complete list of sites posted on the Trust's volunteer site.

Please contact Mary O'Brien (Utah Forest Project Manager for the Trust) at mob@uoregon.edu with your phone number or email, and Season or Mary will soon contact you to ask which of the reference sites you choose to botanize, and when. Your choice, our gratitude to UNPS.—*Mary O'Brien*

*Above: Past UNPS President Bill Gray examining some native flora or searching for his missing car keys on a 2008 Grand Canyon Trust project. Right: Nodding onion (*Allium cernuum*). Photos by Dave Gardner.*

Noteworthy Discoveries

New County Record for *Berberis (Mahonia) fremontii*

Above: Fremont's barberry from Iron County, Utah. Photo by D.N. Reynolds.

While walking through a future homesite in our neighborhood, we found a single, large specimen of *Berberis fremontii* that appears to be a new record for Iron County. The shrub was over 6 feet tall, growing along a shallow wash in undisturbed Pinyon-Juniper woodland with a Sagebrush understory. The location is Section 32, T 36 S, R14 W, just a few hundred yards north of the Dixie National Forest boundary in south central Iron Co. at an elevation of about 5700 feet.

According to the 2008 edition of *A Utah Flora*, the species is previously known in Utah only from Emery, Garfield, Grand, Kane, San Juan, and Washington counties. It was first collected by John C. Fremont along the Virgin River in southern Utah during his second expedition in 1844.

A local hunter has told us that he has seen more plants a few miles north of this location in the foothills of the Antelope Range and we have begun making trips to look for them.

The new homeowner appreciates the significance of this shrub; it has been protected during construction and will be a major attraction on the approach to the new home.— *Douglas Reynolds and Mike Holgerson*

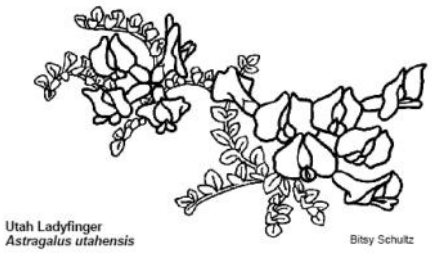
Northern Utah's Hybrid Oaks

Gambel's oak (*Quercus gambelii*) is a common component of shrub communities in the foothills of the Wasatch Range and other mountains of northern Utah. This species is easily recognized by its deeply divided deciduous leaves with smooth, rounded lobes. Occasionally, specimens can be found with atypical leaves having much shallower lobes with sharp tips. These individuals may be of hybrid origin between Gambel's oak and Turbinella live oak (*Q. turbinella*), an evergreen shrub with spiny, shallowly lobed or toothed and holly-like leaves. Hybrids (called *Quercus x pauciloba*) are often best recognized in late fall when they are still in leaf but Gambel's oaks have already shed their annual foliage.

The origin of the hybrid oaks in northern Utah is something of a puzzle, as the two parent species do not naturally co-occur north of Washington, Kane, and San Juan counties. Walter Cottam and his students at the University of Utah studied this problem for many years and helped identify several hybrid oak colonies in the greater Salt Lake area. In a 1959 paper, Cottam suggested that Turbinella oak expanded its range northward to the shores of Lake Bonneville during a dry period of the Middle Holocene (5000-8000 years ago) where it came into contact with Gambel's oak. Hybrids occurred between the two parents and were able to persist as vegetative clones, much as Gambel's oak does today in many populations. The range of Turbinella oak has since contracted as summer precipitation has decline in northern Utah and the climate has become characterized by earlier fall or later spring frosts. The hybrid oaks may have persisted for several thousand years to the present day as root sprouts, even though one of their parents is no longer found in the immediate area. Hybrids are quite common in southern Utah where the two parent species co-occur.

This November, UNPS stalwarts Tony Frates and Bill Gray visited several of the hybrid oak populations in the Wasatch and Oquirrh mountains outside of Salt Lake City with Leroy Wullstein, a retired biology professor from the University of Utah. Despite the late date the hybrids were still in full leaf and thus readily identifiable. Bill Gray even located one of the clones by doing a GoogleEarth search on his home computer (the aerial photo on the website was apparently made in the fall when the oak still had its leaves!). You can read more about the mystery of the hybrid oaks and see photos from Bill and Tony's excellent oak adventure on the UNPS website at www.unps.org/hybridoak/hybridoak.html and links cited therein. - *Walter Fertig*

Do you have a noteworthy discovery to share? Attain fleeting botanical fame by submitting it to the Sego Lily!



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