Sego Lily

Newsletter of the Utah Native Plant Society

September 2012 (volume 35 number 5)

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Above: Watson's goldenbush (*Haplopappus watsonii)* being visited by a UIO (unidentified invertebrate object— perhaps some sort of beetle?) on Antelope Island, Utah. This species can be recognized by its glandular-hairy leaves, low shrubby habit, and relatively small flower heads with yellow ray flowers. Taxonomists remain divided on the proper placement of the North American *Haplopappus* species, which vary considerably and are apparently distinct from the true *Haplopappus* taxa of South America. Recent treatments place *watsonii* in the genus *Ericameria* along with other shrubby *Haplopappi* and the woolly-tomentose species of rabbitbrush, such as *Chrysothamnus nauseosus*. Photo by Steve Hegji, July 2012.

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Website: For late-breaking news, the UNPS store, the *Sego Lily* archives, Chapter events, sources of native plants, the digital Utah Rare Plant Field Guide, and more, go to unps.org. **Many thanks to Xmission for sponsoring our website.**

For more information on UNPS: Contact Bill King (801-582-0432) or Susan Fitts (801-756-6177), or write to UNPS, PO Box 520041, Salt Lake City, UT, 84152-0041 or email unps@unps.org

Sego Lily Editor: Walter Fertig (walt@kanab.net). The deadline for the November 2012 *Sego Lily* is 15 October 2012.

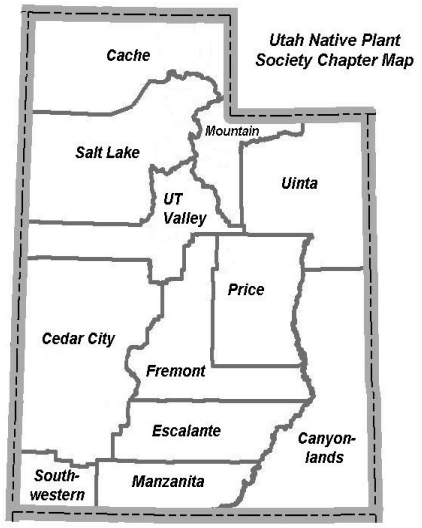
The *Sego Lily* is a publication of the Utah Native Plant Society, a 501(c)(3) not-for-profit organization dedicated to conserving and promoting stewardship of our native plants. We encourage readers to submit articles for potential publication. By submitting an article, an implicit license is granted to print the article in the newsletter or other UNPS publications for reprint without permission (in print and electronic media). When submitting an article, please indicate whether it has been previously published or submitted for consideration to other publications.

Chapter News

Salt Lake: In June we had our last evening meeting of the season, with Joel Tuhy proving that it is indeed possible to go through a complete alphabet of plant names in Utah, with photos to prove it. Joel provided much more than a slide show, adding a lot of fascinating details about the plants, their natural history, and their relationships to humans.

Two field trips proved very popular. The first was to the beautiful upper Lambs Canyon watershed in June, hosted by Bill Stockdale. Although a really dry season left the display less exuberant than previous years there was actually a good variety of flowers - around 70 species were found in various stages of blooming.

In July we had a joint field trip with the Wasatch Rock Garden Society. Initially Richard Jonas had planned an overnight outing to the high Wasatch Plateaus above Huntington. This plan was scrapped when reconnaissance showed that almost nothing was in bloom because of the drought. Undeterred, Richard explored several options in the Uintas near Bald Mountain. Although we were chased off of the peak by a thunderstorm we enjoyed shorter hikes to some of the lakes and a good array of subalpine flowers.



We start the new indoor season on September 5th with our annual UFO night. Members are invited to send photo of Unidentified Flowering Objects to me (cyberflora @xmission.com), and I will produce a slide show with as many answers as possible. Monthly meetings are held at 7 PM the first Wednesday of each month at REI, 3300 South and 3300 East in Salt Lake City. - *Bill Gray*

Southwestern (Bearclaw poppy): Kaye Robinson will be presenting "What is in your Hood? Knowing your Plant Neighborhood—Legends, Stories, and Usages of Native Plants and Trees" on Tuesday, September 18th at 7 PM in the Canyon Community Center in Springdale. Kaye will be sharing information and anecdotes about the local flora from her Native American grandfather.

We will also be hosting a fall Native Plant Sale on Saturday, October 13 from 9-12 noon at the Bit & Spur restaurant in Springdale featuring Janett Warner of Wildland Nursery. - *Barbara Farnsworth*

Bulletin Board

Annual UNPS Members Meeting, October 13: The Cache Chapter of the Utah Native Plant Society will be hosting this year's annual members meeting and New World potluck on Saturday, October 13 starting at 12:30 PM. Guest speaker will be Dr. Ralph Whitesides who will discuss the weeds of Utah and recent changes to weed regulations in the state. The meeting will be held in the multipurpose room of the Cache County Annex Building (room 109), at 179 North Main in Logan. All members are invited to attend to meet other members and UNPS officers, share their favorite foods from North or South America, and learn about some weeds. For more information, contact Michael Piep (435-797-0061 or Michael.piep@usu.edu).

Phragmites Identification Workshop: Join the Intermountain Herbarium and our partners in a workshop to learn how to identify native *Phragmites* from the invasive introduced form. The morning will be spent in the classroom, then following lunch we will carpool to the Benson Marina area to view both types in the wild. *Phragmites* guru Eric Hazelton will lead this workshop. Eric has worked on *Phragmites* for the better part of the last 10 years both here in Utah and on the East Coast of the United States.

Day: Saturday, September 22. Time: 9 AM. Location: Utah State University campus (classroom location TBA). Cost: $25. Pre-registration is required and can be done by submitting the registration form to the herbarium electronically or by mail by September 15. For more information, please contact Michael Piep, assistant curator (435-797-0061 or Michael.piep@usu.edu) or see the Intermountain Herbarium's webpage.

New INPGA Publication: Our friends at the Intermountain Native Plant Growers Association (INPGA) have launched a new quarterly publication called *O'Pinyon*. The color publication features news about the Association's activities and articles on a range of native plant topics from the western United States. The first issue is available online at www.utahschoice.org and features stories by Larry Rupp on why to choose native plants, Wayne Padgett on using native plants for restoration on the Colorado Plateau, and Catarina Blais on Wasatch wildflowers.

Calochortiana, the new UNPS science journal seeks papers: The inaugural issue of UNPS's new annual scientific journal will be published on the internet in the winter of 2013. The purpose of the journal is to provide a forum for previously unpublished research on the flora and vegetation of Utah. We are seeking submissions on monitoring or status of rare species, seed propagation protocols, floristic checklists, synopses of taxonomic groups (but not descriptions of new species), genetic studies, vegetation descriptions/mapping, natural history research, or other useful papers that might not otherwise be accepted in existing journals. All papers will be peer-reviewed and editorial content will be overseen by the UNPS Publications Committee. Submissions for the first issue will be accepted through October 31, 2012. For more information, contact editor Walter Fertig (walt@kanab.net).

Department of Corrections: In the July issue I mistakenly promoted Dr. Steve Love to the presidency of the American Penstemon Society, when he is actually the editor of its official "Bulletin". My apologies to Val Myrick, the real president (Steve is president of the Intermountain Native Plant Growers Association).

My review of the new Colorado Rocky Mountain Wildflower App neglected to mention that the app is compatible with most smart devices (besides the brands I listed). If you are uncertain whether it will work with your smart product, you can download a free demo app. I also should have mentioned that searches can be done by common or scientific name (or any part thereof) and that the app covers 84 families and 200 genera that represent all of the major habitats of the region. - *W. Fertig*.

Unidentified Flowering Object: The July UFO was Showy rushpink (*Lygodesmia grandiflora*) by Jim Case. Many people are surprised to learn that rushpink is a member of the sunflower family rather than a Caryophyll or representative of some other family. Don't be fooled by the 5 "petals": each is actually a separate ray-like ligulate flower!

This months UFO is an annual from mountain brush and sagebrush areas of northern Utah, submitted by Steve Hegji. It is from a small and often stinky family. Any guesses?

Do you have a UFO to share? Send it in! - *W. Fertig*

In Quotes:

" We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect." -Aldo Leopold, *A Sand County Almanac*

Dendroctonus the Destroyer

How pine beetles are changing the face of North American forests

By Diana L. Six. Reprinted from *Kelseya*, the newsletter of the Montana Native Plant Society, Fall 2010

Scientific names often describe important features of the organisms to which they are attached. The mountain pine beetle, for example: its genus name, *Dendroctonus*, is formed from *Dendro* —meaning tree — and *tonus* — meaning destroyer. Judging from the beetle's effects on many western forests these days, the name seems particularly apt. Its species name, *ponderosae*, indicates that this beetle is found in ponderosa pine; however, while it often kills substantial numbers of this tree, pine beetles prefer lodgepole pine—and it is in lodgepole that pine beetles develop their largest, most spectacular outbreaks.

The mountain pine beetle is native to western North America and sporadically develops outbreaks that lead to vast expanses of trees killed. These beetles are a natural disturbance agent that, like fire, act to regenerate forests and to maintain the structure and resilience of our dynamic forest ecosystems.

However, the current west-wide outbreak is different in many ways from those that have occurred in the past, indicating that the role this insect plays in our forests may be changing. First, the current outbreak is bigger by an order of magnitude — ten times larger — than any recorded beetle outbreak in the past. It is estimated to have affected over 22 million acres and is still increasing. In fact, 80% of the mature lodgepole pine in British Columbia is predicted to be pine beetle-killed by 2013 (and, much of those forests are already dead).

Second, due to a warming climate, the beetle is expanding its range. The insect now has moved hundreds of kilometers farther north, infesting trees in areas where previously it was too cold for the bugs to survive. They also have jumped the northern divide and now are moving across Alberta, where they are attacking jack pine, a species new to the beetle. One fear is that pine beetles may move across the continent in jack pine and then begin to infest eastern forests.

*Above: Mountain pine beetle (*Dendroctonus ponderosae*) from Wikimedia website.*

Warming temperatures also have allowed pine beetles to move higher in elevation, where they are devastating whitebark pine at treeline. While lodgepole pine is expected to regenerate well after beetle populations decline, whitebark pine is not expected to recover in many places. The loss of this keystone species has serious implications for snow pack retention, wildlife and fisheries, and indeed, the function and structure of our entire western subalpine ecosystem.

What's behind it?

Most of the time, mountain pine beetles are present in our pine forests in very low numbers. So what happens that allows populations to expand into an outbreak? Some observers believe that appropriate stand conditions alone (particularly, pure stands of mature lodgepole pine) can cause an outbreak, but this is not true. Outbreaks require a trigger, and triggers for the mountain pine beetle include warm temperatures and drought. Each greatly influences the speed at which beetle populations grow, and the rate and amount of tree mortality that occurs in an area.

Warm temperatures act as a trigger because they better support the growth and survival of the insect, allowing populations to build to the point where beetles can overwhelm even healthy, resistant trees. Drought acts by stressing trees and reducing their ability to defend themselves against attack. It takes fewer beetles to kill trees with low defenses. The double whammy of better beetle productivity and fewer beetles required to overwhelm a tree's defenses can quickly lead to outbreak populations of beetles. Most past outbreaks have occurred during pulses of warm temperatures combined with drought, and the end of these outbreaks usually has coincided with a return of cooler, wetter conditions. This "control" of outbreaks by the return of environmental conditions unfavorable to beetles meant that outbreaks usually declined before all mature pines in an area were killed. However, with long-term climate change, chronic warm, dry periods mean we cannot rely on a return to "normal" conditions to contain the beetles.

Life and Death

Despite their small size (about like a grain of rice) and a healthy tree's ability to fight back with resin and other substances, mountain pine beetles overcome trees through a coordinated mass attack initiated and controlled by chemical signals. A beetle chooses a tree and bores in. As she bores (it's always a female that starts the attack), she releases an attractant pheromone that will draw in any nearby mountain pine beetle, male or female. Responding beetles add to the call by releasing more pheromone. If these initial attackers can attract sufficient help, the tree's defenses are overwhelmed and it reaches a "point of no return" from which it cannot recover. At this point, the beetles switch to releasing a repellant pheromone that tells any new arrivals to go away, the tree is full. This allows beetles to avoid overcrowding that would result in starvation of their offspring.

Yet even after a tree is overwhelmed, beetles still face big challenges. One of the biggest is their food source — wood — is very poor nutritionally. Beetle larvae feed in the phloem layer just under the bark. Phloem is mostly indigestible cellulose and contains only low amounts of nitrogen and other nutrients that beetles need. To overcome this problem, beetles carry nutritional supplements in the form of fungi. These fungi are carried in little pockets, called mycangia, in the exoskeleton of attacking adult beetles. As beetles tunnel under bark to lay their eggs, their fungi are released and begin to grow in the phloem and sapwood of the tree. Larvae feed on the fungi as well as the phloem. This supports their survival and growth by increasing nitrogen and probably other nutrients in their diet. The fungi also support adult reproduction, most likely through providing the sterols beetles need to produce cell membranes and hormones.

So-called blue-stain fungi are obvious in a beetle-infested tree when the bark is peeled off. The blue color of the wood in infested trees is due to melanin (the same compound responsible for the color in human skin) in the cell walls of the fungi. The fungi do not reduce the structural integrity of wood, but the color can downgrade the wood at the mill, decreasing the financial value of logs from beetle-affected trees. Some innovative woodworkers, however, have begun to make specialty products, such as furniture and bowls, out of the blue-stained wood, capitalizing on the beauty of what is now called "denim pine."

Mountain pine beetles are considered one of the most difficult of all insects to manage in a forest. This is not surprising. The beetle has an amazingly complex biology and is a rapid and strong responder to changes in environmental conditions. Under outbreak conditions, across large areas of forests, there often is little that can be done to reduce the mortality of trees. For homeowners, there are some measures that can be taken. The removal of infested trees is paramount to reducing spread. High-value living pines can be treated with either pesticides or repellant pheromones to help them stave off infestation. And coordinating across a neighborhood is also important as beetles do not respect property lines!

Below: Beetle-killed Engelmann spruce on Cedar Mountain. Photo by W. Fertig.

Woodsman, Spare that Dead Tree

By Walter Fertig

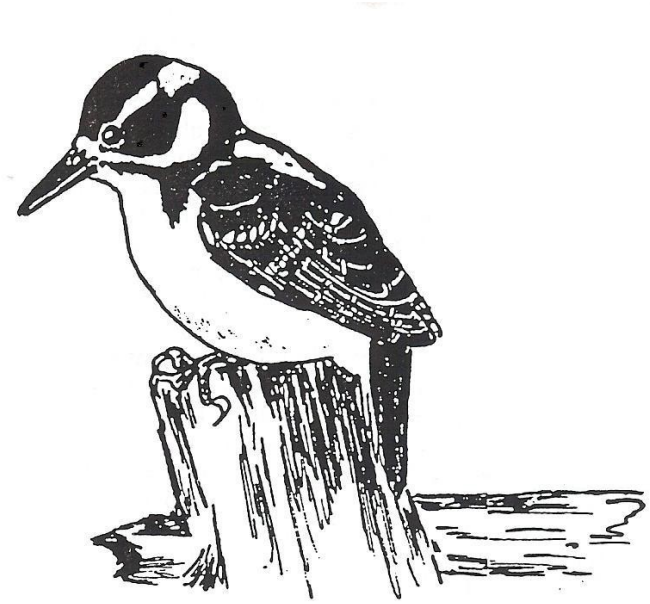
Living trees are universally praised for their beauty and economic value, but dead trees evoke an entirely different response. To a commercial forester, a dead tree is the epitome of waste, both of space and lost revenue. The park manager views the dead tree as a safety hazard due to falling limbs or fire. For the homeowner or hiker the deceased tree is simply an untidy eyesore. Invariably, our gut reaction is to remove the offending tree.

But there is much more to a dead tree than meets the eye. As a source of food and shelter for wildlife, a dead tree can be just as valuable as a living one. More importantly, dead trees are a warehouse of stored nutrients that when returned to the soil foster the growth of a new generation of forest plants and trees.

Insects initiate the process of converting dead timber into new resources. Certain beetles and other insects with hard mouth-parts are able to bore into the bark and dead sapwood. Fungi find a suitable home in the dark tunnels created by the borers and will begin to decay the inner tree tissues. As the fungi microflora evolves, new insect grazers are attracted to the tree. Studies of northwestern forests reveal that eventually more than 300 species of insects will utilize a dead tree for food and to reproduce.

The insects themselves provide a source of protein for dozens of species of birds and omnivorous mammals. These in turn may become food for birds of prey and higher mammalian carnivores. This makes the dead tree the base of a large forest food chain.

Dead trees are a major resource for woodpeckers. The birds are attracted to dead snags to feed on carpenter ants and grubs. With their chisel-sharp bills, woodpeckers are also able to drill out nesting holes in the dead wood. These cavities not only serve



*Above: Hairy woodpecker (*Picoides villosus*) by W. Fertig.*

woodpecker families, but also give shelter to squirrels, chickadees, wrens, wood warblers, nuthatches, screech owls, and wood ducks which could not otherwise make their own holes.

As the tree continues to decay, stormy weather will begin to damage the crown and branches, creating new openings for wildlife shelter. Hawks, owls, raccoons, flying squirrels, and bats are quick to take advantage of such new sites.

Surrounding plants and trees also benefit from the passing of a tree, Openings in the canopy formed by tree death allow sunlight to flood the forest floor. Seeds that may have lain dormant in the soil for years, or underbrush previously stunted by lack of light respond to sunnier conditions with a burst of growth. In addition, water and minerals used by the tree when it was living are now available for other plants.

While the tree gradually decomposes, the nutrients it accumulated during its life are returned to the soil bit by bit. This occurs by leaching or through the dead bodies and feces of insect decomposers. The release of mineral nutrients, like calcium, potassium, and nitrogen, to the soil is particularly important because such nutrients are often in low supply under natural conditions. The time-released influx of natural fertilizer provided by decaying trees helps maintain a rich woodland ecosystem, which in turn benefits wildlife and humans.

Foresters are now beginning to recognize the value of leaving some dead trees in the stands they manage. Removing a dead tree prematurely deprives hundreds of wildlife species of valuable habitat and food. It reduces the finite nutrient supply that long term growth depends on. Although economic realities may prevent leaving all dead trees standing, the prudent forester now realizes that leaving some dead trees is important for future forest productivity.

In natural systems no resource is ever wasted. We could profit a great deal by following nature's example.

Important Plant Areas of Utah

Text and Photos by Walter Fertig

In the 1980s the European organization BirdLife International devised the "Important Bird Area" (IBA) program to highlight specific sites of high conservation significance to regionally or globally rare birds. To date, over 8000 such sites have been identified in 178 countries, including over 2600 in North America, where the program is administered by the National Audubon Society. IBAs have no formal, legal status and may or may not be protected, but serve to draw attention to areas that provide essential breeding or migration habitat for rare or unusual bird species. Increased awareness often leads to improved site stewardship and greater visitation (and spending) by bird enthusiasts.

Knowing a good thing when they see it, botanists have adopted the IBA concept for plants. The first "Important Plant Areas" (IPAs) were designated in Europe in 1995. The IPA program was later incorporated into the 2002 Global Strategy for Plant Conservation (GSPC), itself an outgrowth of the 1992 UN Convention on Biological Diversity*. The initial goal of the GSPC was to identify and protect 50% of the most important areas for plant diversity worldwide by 2010. The deadline has since been extended to 2020, with the new goal of identifying and protecting 75% of the most important sites.

IPAs are defined as areas with atypically high concentrations of globally rare, threatened, or endemic plant species, exceptionally high species richness (the total number of species), or outstanding examples of regionally or globally uncommon plant communities or vegetation types. These areas should have viable populations of the target plant species, be in relatively good condition, and have boundaries that are biologically defined. IPAs may range in size from under 2 acres to several thousand acres, depending on their objectives. Often IPAs are selected on the basis of their complementarity or presence of uncommon species missing from other sites.

The main value of IPAs is to bring attention to special areas that may warrant greater management attention. The IPA program does not confer any special legal status to a site (no black helicopters patrol the perimeter), although IPAs are often located within existing parks or preserves.

Hundreds of IPAs have been recognized in over 65 countries. The vast majority have been established in Europe (Turkey has been a leader in the effort, with over 120 sites identified). In the United States, IPA programs are underway in several states. The Montana Native Plant Society, for example, has been a leader in promoting the idea and named its first IPA in 2010 (the Logan Pass area of Glacier National Park).

In 2010, the board of the Utah Native Plant Society established a committee (chaired by Mindy Wheeler) to develop an IPA program for Utah. The committee has established some basic listing criteria and a process for nominating and evaluating potential sites in the state. Committee member Jason Alexander of Utah Valley University is currently developing a website to highlight Utah IPAs that will include site maps, species lists, and photos and supplemental information on selected species of interest. Fellow committee member Robert Fitts of the state natural heritage program is soliciting interns to map clusters of rare species to help identify potential IPA sites.

The first IPA to be officially recognized by UNPS is Cedar Breaks in southeastern Iron County. The Cedar Breaks IPA includes Cedar Breaks National Monument and the adjacent Ashdown Gorge Wilderness of Dixie National Forest. The area contains colorful badland cliffs of the Eocene Claron Formation (below left) that provide habitat for 15 rare and endemic plant species (such as Reveal's paintbrush, above) and the state's largest and oldest Bristlecone pines (see articles by Doug Reynolds in the July 2007 and March 2008 *Sego Lily* for more information). Although the Cedar Breaks IPA only contains about 440 species, many of these (such as Arizona willow) are inadequately protected elsewhere in the state.

The UNPS IPA committee is currently considering other areas as potential IPAs (Mount Timpanogos is next in line for designation). UNPS members interested in nominating a site should contact the committee (www.unps.org) for a nominating form and other information.

* Also known as the Rio Convention (for the host city, Rio de Janeiro), it has been ratified by every country on Earth except Andorra, the Holy See, and the United States..

Wildflower Photography Techniques: Homemade Boxes

Text and photos by Steve Hegji

Wildflower photography, especially a close up "portrait" picture, presents a variety of difficulties. Wind moves the plant, bright sun creates "blown" highlight spots, and the background can be distracting, reducing the appearance of fine detail. The two devices shown in Figure 1 were created to ameliorate these difficulties and were built for under $20. I call them the "black box" and the "white box".

The photographs with very dark backgrounds that I'd seen in *Utah Wildflowers*, by Richard Shaw, motivated me to construct the black box. It's a plastic "bread box". The key features are that it is a non-colored, translucent plastic with a fairly deep dimension. It helps that one side is flat so that it can be positioned on top of objects without rolling off. I painted the bottom 2/3's black, and my wife glued some black velvet on the inside. A portion of the flat bottom was cutout as shown. I use the box in the horizontal position so that the flower is positioned inside the unpainted front portion of the box, with the stem portion of the flower extending down through the cutout. I then position the camera so that the black interior is in the background of the photograph. Sheltering the plant inside the box helps a bit with the wind. The translucent nature of the plastic diffuses the light. The black interior creates a high contrast background which helps show off fine detail. Figure 2, a photo of *Potentilla gracilis* shows the results. One black box caveat: if you can't set your camera to "spot metering" and point that spot at the brightest part of the flower, then the camera will average in some of the black background and the flower will be very overexposed.

The black box, because of its depth, is sometimes difficult to orient and hold in position. So the next construction was the white box. It was one piece of a plastic container set. As you can see in Figure 1, I cut a hole in the bottom large enough that my camera lens can be inserted through it. The hole is off center so I can get a variety of angles just a bit off vertical. The box is placed, mouth down/hole up, over the top of the plant. This completely shelters the plant from the wind. This plastic is fairly clear so I may spray a thin coat of white paint on the outside to diffuse the light even more. I shoot the picture down through the hole. Because I am getting fairly close to the plant, if the plant has any height the background will be nicely out of focus. Figure 3, again a photo of *P. gracilis*, shows the results. In the future I plan to add an accessory to the white box – a black cloth that I can place around the base of the plant. One white box caveat: if your camera can't focus fairly close to an object, this design will not be useful to you.

The boxes I constructed have their limitations, but for the situations that fit their geometry, they are doing a great job for me. I hope they stimulate your own creative efforts.

Figure 1, above: Homemade "black box" (left) and "white box" (right) for controlling wind and light conditions when photographing wildflowers.

Slender cinquefoil (*Potentilla gracilis*)

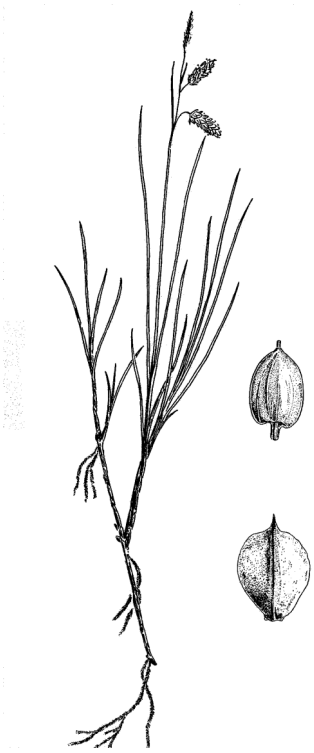
Slender cinquefoil is one of Utah's most common and variable *Potentilla* species. Five varieties are recognized in *A Utah Flora* based on differences in leaflet shape and pubescence. Var. *pulcherrima* is perhaps the showiest, with the white-woolly undersides of the leaflets contrasting with the dark green upper surface. Var. *elmeri* is distinguished by its deeply dissected leaflets with the slender lobes often being over 5 mm long. Other varieties have glandular flowers or leaves (var. *brunnescens*), leaflets equally green on both sides (var. *fastigiata*), or pinnately-divided white-woolly leaves (the recently named var. *hippianoides*, which may be derived from crosses with *P. hippiana*). Despite their common name (translated as '5 leaves'), *Potentilla gracilis* frequently has 7 or even 9 leaflets, usually arranged in a palmate fashion, like fingers on a hand. - *W. Fertig*.

*Figure 2, above: Selnder cinquefoil (*Potentilla gracilis) *photo taken using a black box*
Figure 3, below: Photo of Potentilla gracilis *and arthropod friend, taken using a white box.*

The Path Not Taken
(with apologies to Robert Frost)

By Lauren Brown
Reprinted from the Fall 2011 *Newsletter of the Connecticut Botanical Society*

Carex limosa
(from Hermann 1970)



Two traits diverged in a murky key,
And sorry I could not fathom both,
And know the sedge, long I stood
And pondered each as well as I could:
Were there stigmas two or three?

I went for three, just as fair,
And having perhaps the better claim
Because I threw my hands up in the air
For as except the little beak
They both to me looked just the same.

And both that morning equally lay
In mysteries of Haines and Gray*
Oh, I kept the first for another day!
Yet knowing how way leads on to way,
I wondered if I should maybe pray.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two traits diverged in a murky key, and I -
I took the one less stupefied
And never will know the difference.

* Arthur Haines and Asa Gray each wrote a flora of eastern North America.

Plant Profiles:

Mountain Avens, Little Nymph of the Alpine

by Walter Fertig

The genus *Dryas* contains 2-6 species of low, mat-forming perennials in the rose family (Rosaceae). All are characterized by relatively large, white or yellow flowers on naked stalks borne above a dense rosette of shallowly lobed leaves. In fruit, the solitary flower is replaced by a woolly cluster of single-seeded achenes, each topped by long, silky-feathery white hairs. These hairs are modified from the persistent styles and help spread the attached seed via the wind. The thick tufts resemble the locks of Troll Dolls (popular in the 1960s), but apparently reminded Linnaeus more of mythological dryads or wood nymphs of ancient Latin lore when he named the genus.

Mountain avens (*Dryas octopetala*) is a circumpolar species found in arctic tundra of northern Eurasia and North America, but also extending southward above treeline in the Cascades and Rocky Mountains to Washington, Oregon, Utah, and Colorado. The species is morphologically variable and has been segregated into several distinct species and varieties over the years. Utah plants belong to var. *hookeriana* and are restricted to the higher reaches of the Uinta Range. Ecologists have also been drawn to the species on account of its different growth forms associated with late snowbed sites and rocky scree slopes. Reciprocal transplant experiments have confirmed that the ecotypic variability between sites is genetically based, but sufficient gene exchange still occurs to prevent speciation

.

Above: Mountain avens by Peter Lesica.

Fossils of *Dryas* plants are important to paleo-ecologists studying past episodes of climate change and shifts in arctic-alpine vegetation. Late in the Pleistocene, the climate of the northern hemisphere began to gradually warm as the last great Ice Age went into retreat. On two occasions the general pattern of warming was abruptly reversed for periods of 300-1000 years and arctic tundra vegetation returned to areas that had been changing to forest cover. Ecologists refer to these periods of time as the Older Dryas (approximately 13,800 years ago) and the Younger Dryas (11,500-12,800 years ago) because of the prevalence of *Dryas* fossils. The exact cause of the relatively rapid change in climate (estimated to have taken just a few decades) are still being debated, but may bear on research into contemporary climate change.

The flowers of Mountain avens track the movement of the sun across the sky during the day, a phenomenon called heliotropism. Most plants that have similar abilities do so to reduce the amount of solar radiation striking their flowers or leaves. In *Dryas*, the flowers do the opposite, moving to maximize the amount of sunlight reflecting off the petals and onto the mass of pistils at the center of the flower. Experiments by researchers in Sweden have shown that flowers that track the sun are warmer and have pistils that develop faster and produce heavier seeds than those that are shaded, have their petals removed, or are otherwise manipulated to prevent heliotropism.

This essay is adapted from the "Plant of the Week" feature of the US Forest Service's "Celebrating Wildflowers" website (www.fs.fed.us/wildflowers).

Botanica

Odds and Ends from the World of Botany

by Walter Fertig

Sayonara *Sphaeromeria*: In 1976, Arthur Holmgren, Leila Shultz, and Tim Lowrey published a paper in the journal *Brittonia* that could be summed up by its title: *Sphaeromeria*, a genus closer to *Artemisia* than to *Tanacetum* (Asteraceae: Anthemideae). Now, an international team from Spain, the United Kingdom, and the USDA Shrub Lab in Provo have presented molecular phylogeny data that strongly suggest *Sphaeromeria* is so closely related to *Artemisia* that it should be placed in the latter genus. The findings, published in the American Journal of Botany in 2011, also expand *Artemisia* to include the monotypic genus *Picrothamnus* (also known as *Artemisia spinescens*).

Species of *Sphaeromeria* (commonly called false-sagebrush or chicken-sage) are woody at the base and have variably lobed or finely dissected silvery-hairy leaves and small, greenish-yellow flower heads without ray flowers. Morphologically, they resemble many of the smaller species of sagebrush (*Artemisia*) and also share some anatomical features. *Sphaeromeria* species are restricted to western North America and many are quite rare.

As a result of this taxonomic card shuffling, several species names in *Sphaeromeria* have to be changed, because another *Artemisia* species already has the same specific epithet (not allowed under the rules of nomenclature). Thus *Sphaeromeria diversifolia* of the Wasatch foothills in Utah is now *Artemisia inaequifolia* and *S. argentea* becomes *Artemisia macarthuri* (named for Utah's own sagebrush biologist, Durant McArthur—though the spelling was changed to conform with an obscure clause in the Botanic Code). Two rare species from Utah, *S. capitata* and *S. ruthiae* (endemic to Zion National Park and immediate vicinity), keep their epithets under *Artemisia*.

Right: Ruth's chickensage (formerly Sphaeromeria ruthiae*, now* Artemisia ruthiae*) from Walter's Wiggles in Zion National Park. Photo by W. Fertig.*

A Tribute to Beverly Albee

By Leila Shultz

Beverly Jane (Geiger) Albee, age 90, died June 25th in Grand Junction, Colorado. Her contributions to our knowledge of the Utah flora are legion, through her numerous collections, careful annotations, and published work. She was the Assistant Curator of the Garrett Herbarium for nearly twenty years in the 1970s and 1980s and worked with Lois Arnow as a co-author of the *Flora of the Central Wasatch Front*. In 1988, the University of Utah Museum published the *Atlas of Utah Plants*, with Beverly as the lead author. This work was the culmination of eight years of examination and mapping of collections at University of Utah (Garrett Herbarium), Utah State University (Intermountain Herbarium), Brigham Young University (S. L. Welsh Herbarium), Weber State University, and special collections with the National Park Service, Bureau of Land Management, and U.S. Forest Service. Anyone working with these herbarium collections will learn to recognize Beverly's penciled notes accompanied by the initials "BA".

Bev, as she was affectionately called by her colleagues, was a no-nonsense, enthusiastic seeker of information. Endlessly curious about new taxonomic alignments and always ready to go looking for a new record, she was thorough in her documentation of the local flora. In thinking about how to describe her in a few phrases, I would include "generous, tough, great (and crusty) humor, and down-to-earth." We spent nearly a decade together working on the *Atlas of Utah Plants* -- transporting boxes of specimens between the Garrett Herbarium and the Intermountain Herbarium, verifying or correcting identifications and mapping distributions – one family at a time – but rarely had time to just talk. Time was always precious, and most of what I remember is the lugging of boxes up and down flights of stairs – discussion of groups of plants with particular problems – complaining about new alignments – difficulty in pinning down location records – eating some dashed together lunch while looking at specimens, then scheduling the next time we would trade boxes. Along with our third author, Sherel Goodrich, we examined approximately 400,000 specimens at U of U, BYU, and USU. We were determined to be as consistent as possible in our taxonomic determinations, so we worked one genus at a time in a 'divide and conquer' strategy.

Above: Beverly and Howard Albee in the field. Photo provided by Jim Albee.

I knew by the wealth of "B. Albee" herbarium specimens that she had worked in unmapped (literally) territory when she accompanied her husband on his geological surveys in western Wyoming and throughout the Wasatch Mountains and Plateau of Utah. I wish now that I knew more about the conditions under which she camped and explored, but I am reassured that her contributions will be used and appreciated by generations to come.

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