



Newsletter of the Idaho Native Plant Society Promoting Interest in Idaho's Native Flora

Evidence of Varietal Differentiation in *Eriogonum calcareum*

By Brittni Brown

Islands offer unique opportunities to study differentiation in plant species. Although the Intermountain West is fresh out of the tropical islands that typically come to mind when thinking about paradise, it does have an array of barren ash-outcrops scattered across it that create islands of unique edaphic (soil-influenced) habitats surrounded by a sea of sagebrush-steppe (or at least former sagebrush-steppe). These ash-outcrop islands vary greatly in color, texture, deposition history, and chemical composition—attributes that seem to encourage high rates of endemism in resident species. However, despite the large number of plant species endemic to these barren ash-outcrops (Table 1), few studies have investigated the relationship between soil properties and either species' distribution or their evolution. With that in mind, Don Mansfield (Biology Department, College of Idaho) and I struck out to investigate differences in morphology and geographic distribution in the ash-endemic buckwheat *Eriogonum calcareum* (Harper wild buckwheat).

Eriogonum calcareum is restricted to barren outcrops of the Glens Ferry Formation in southwestern Idaho and the Deer Butte and Bully Creek Formations in southeastern Oregon. Two varieties of the species have been recognized: var. *calcareum* and *sceptrum*. However, some Idaho field botanists have long questioned if varietal differentiation is justified; after all, the varieties may be similar enough to simply be two extreme forms on a continuum rather than distinct varieties. If they are distinct, they should have either separate geographic distributions, distinct ecological settings, or both. We tested the hypothesis that the

two varieties do have differing morphological and geographic characteristics, and are adapted to different soil characteristics.

To test morphological differentiation, we measured four distinguishing characteristics—scape length, leaf width, peduncle length, and the proportion of the involucre covered by vestiture—across the full geographic range represented by 27 specimens present in the College of Idaho's Harold M. Tucker Herbarium. Based upon our measurements, we divided our specimens into four groupings—unambiguous *calcareum*, unambiguous *sceptrum*, *calcareum* approaching *sceptrum*, or *sceptrum* approaching *calcareum*. We then examined soil properties by collecting samples at nine outcrops across the species' geographic range and having them analyzed for pH and the extractable cations magnesium, potassium, calcium, and sodium.

Our analysis found the two varieties are indeed distinct, not only morphologically, but by geographic distribution and edaphic properties as well! Twenty-one of 27 specimens were classified as either unambiguous *calcareum* or

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Announcements

2017 Idaho Botanical Foray

The annual Idaho Botanical Foray celebrates its 10th anniversary in 2017. This year the event will take place July 6-9 in Bear Valley, located approximately 25 miles north of Lowman, Idaho, on the Boise National Forest. This area contains a mix: a meadow, riparian, forest, and rocky mountain habitats. The foray is an opportunity to improve your botany skills, contribute to the collection of plants for Idaho herbaria, meet and spend time with fellow plant enthusiasts, and enjoy time in the Idaho backcountry. The event is being sponsored by Boise State University and open to everyone interested in Idaho botany.

The current plan is to stay at the Bear Valley Campground, the largest campground in the area with 10 sites. Although reservations cannot be made for this campground, several folks from Boise plan to arrive early and claim camping sites. If needed, two other smaller campgrounds also occur in the general area. These primitive campgrounds have no potable water. Everyone will need to bring their own water, food, and camping gear. Maps, presses, cardboards, newspaper, sharpies, and notebooks will be provided, but bring your own plant collecting gear (digging tools, clippers, GPS) if possible.

As usual, there will be a Saturday potluck dinner, so please bring something to share for that night. And don't forget to bring something from home or work to burn in the campfire that evening. There is still a chance the heavy snowfall from this past winter will preclude the suitability of Bear Valley in early July. If there are any changes for the Foray, new information will be posted on the Idaho Botanical Foray Facebook page. More detailed information about the Foray is also available on [Facebook](#).

2017 INPS Annual Meeting Reminder

The 2017 Idaho Native Plant Society Annual Meeting will be held July 14-17. (See Registration Form next page.) Base Camp will be the Living Waters Ranch, located 4 miles west of Highway 93 on Main Street in Challis (3 miles west of the Golf Course). Living Waters Ranch will provide dinner Friday and Saturday nights.

Make your own reservations with the Living Waters Ranch: Tents: \$12/day; RV: \$15/day; RV with full hook-up: \$18/day; Bunk House: \$14/day; Motel rooms 2 twin beds: \$48/day; Chalets 2 or 3 bedrooms with kitchen: \$110/day; Mini Lodges: 8 bedrooms, each with 2 twins or a queen bed and private bath, large kitchen, \$66 per room, 5 rooms minimum.

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2017 INPS Annual Meeting Registration Form

Annual Meeting July 14, 15, 16, 17
Challis, Idaho

Lodging: Living Waters Ranch, Inc.
PO Box 1190
Challis, ID 83226
(208) 879-2888
Fax: (208) 879-2182
Email: iwrinc@custertel.net
Website: www.livingwatersranch.org

Registration for Events: _____ \$20 per person - Covers two speakers and all field trips.
Friday (7/14) Dinner: _____ \$11 per person
Saturday (7/15) Dinner: _____ \$11 per person
Total Fees: _____

The INPS annual business meeting will be held after the Saturday evening dinner. Speakers are being lined up for Friday and Saturday evenings.

Field Trips:

Saturday: 7/15

Railroad Ridge _____ Bay Horse Lake _____
Chilly Slough Wetland _____ Malm Gulch _____

Sunday: 7/16

Railroad Ridge _____ Bay Horse Ghost Town _____

Monday: 7/17

Railroad Ridge _____

Due to the sensitivity of the high elevation vegetation, only 25 people per day (5 cars) will be traveling to Railroad Ridge.

Please mail Registration (and registration fee) to:

(Checks payable to: Idaho Native Plant Society)

Lois Rohay
PO Box 5985
Twin Falls, ID 83303-5985

Registrant(s):

Name: _____

Address: _____

Phone: _____

Email: _____

Questions? Call Bill Bridges (208) 293-2426

Announcements

Changes Proposed to INPS Bylaws

As needs within an organization change over the years, modifications to the organization's bylaws are needed from time to time. The INPS Board of Directors is recommending that certain changes to the bylaws be made. The proposed changes will be voted on at the annual meeting in July. The proposed changes:

1. Move certain membership responsibilities from the Treasurer to the Membership Committee Chair; clarify the Treasurer's responsibilities for receiving membership dues whether paid in cash or electronically to the Society; clarify notification requirements for the portion of dues paid to the chapters and that the Treasurer shall receive all payments whether cash or electronically received which pertain to special events and coordinate those with the event manager.
2. Show Membership Committee Chair is added as a member of the Board of Directors.
3. State duties of the Membership Committee Chair that are moved from the Treasurer, and clarify those duties and state who may access the membership database maintained by the Membership Committee Chair.
4. Clarify that the newsletter editor or his/her designee shall attend Board meetings in a non-voting capacity.

The exact wording of the proposed changes can be found at http://idahonativeplants.org/inps/Proposed_2017_bylaws_changes_May2017.pdf. The current INPS bylaws can be found at http://idahonativeplants.org/inps/INPS_bylaws_amended_2013.pdf.

unambiguous *sceptrum*. Means of all four measured morphological characteristics differed significantly between the two unambiguous varieties. Geographically, we found that all the unambiguous *calcareum* specimens occurred in the northwestern portion of the species' range, and all north of the Snake River (or west as the river turns north near the Oregon-Idaho border). Alternatively, all unambiguous *sceptrum* specimens occurred in the southeastern portion of the species' distribution, all south or within half a mile north of the Snake River. Morphologically ambiguous occurrences were located along the edges of the variety they most closely represented. Finally, we found the var. *calcareum* sites had significantly higher levels of potassium and magnesium, and lower calcium-magnesium ratios and pH values, than var. *sceptrum* sites.

In preparing our work for publication, we spent a lot of time acquainting ourselves with the geological history of the area to build an understanding of why soil properties of the outcrops might differ between regions. Although few studies have been completed on the exact mineral composition of the numerous outcrops supporting *Eriogonum calcareum*, we do know the outcrops occupied by the two different varieties have different origins and compositions. Much of the region

occupied by var. *sceptrum* is in the Glens Ferry Formation, which is comprised of lacustrine and fluvial sediments of Miocene and Pleistocene Lake Idaho, including oolitic limestones. The region occupied by var. *calcareum* is similarly made up of lacustrine and fluvial sediments, but lacks the oolitic limestone deposits. This could be due to differences in depth and sedimentation patterns for the western section of Lake Idaho. We believe the higher calcium-magnesium ratios and pH level of the var. *sceptrum*-occupied outcrops may be explained by the decomposition of the oolitic calcareous deposits, which tend to have much higher calcium levels.

The impact of these soil chemical differences on morphological variation between varieties is not completely clear. However, it is possible some of the differences could be the results of non-genetic effects rather than adaptation, or some morphological differences could emerge because of different selection pressures experi-

enced by the two populations. We do know that extreme mineral compositions can impose selection pressures on plant populations and drive significant adaptation. However, the levels of minerals in the outcrops we measured were not as extreme as environments where these adaptations have been demonstrated elsewhere. Many of



Eriogonum calcareum var. *calcareum* pressed specimen (from north of Snake River). Photo by Don Mansfield.

our soil property measurements were well within the range that normally impose no stress to plant functions. It is possible selection forces are operating more slowly



Eriogonum calcareum var. *calcareum* habitat in Payette County, Idaho. Photo by Michael Mancuso.

here than in the extreme sites examined in previous studies, or alternatively, that selection pressures could be a result of one of many soil chemistry components unstudied in these outcrops.

We believe morphological variation between the two varieties could also be explained by isolation resulting in reduced gene flow. Outcrops throughout the region vary in size from less than a hectare to hundreds of hectares in size, and all are patchy in nature. Outcrops occupied by unambiguous *calcareum* specimens are no closer than 84 km from outcrops occupied by unambiguous *sceptrum*, and the heavily developed Treasure Valley generally lies between the two sets of populations. The importance of geographic separation and its effect on gene flow and adaptation will have to await further study on genetic interchange and pollinator interaction between the two varieties.

Tracking down one of the two varieties of *E. calcareum* in the field is most easily done by searching for large white-colored ash outcrops either on a program such as Google Earth or by sight from one of the many backroads crisscrossing southwestern Idaho and south-eastern Oregon. The most obvious difference to distinguish the two varieties in the field is that mature *E. calcareum* var. *sceptrum* is a taller, more erect, narrower plant while var. *calcareum* tends to have a more matted, broader habit.

For more information regarding our study, methodology, and results, please see our publication in the journal [Madroño \(Vol. 64, Issue 1, January 2017\)](#). •

Table 1. Vascular plant species endemic to silicic volcanic ash outcrops in southwestern Idaho and south-eastern Oregon.

Outcrops of highly weathered, clay-rich Miocene deposits of the Sucker Creek Formation.

- Cymopterus glomeratus* var. *greeleyorum*
- Lomatium bentonitum*
- Lomatium packardiae*
- Mentzelia mollis*
- Phacelia lutea* var. *calva*

Outcrops of lithified ash-tuff of the Leslie Gulch unit of the Sucker Creek Formation.

- Ivesia rhypara* var. *rhypara*
- Mentzelia packardiae*
- Monardella angustifolia*
- Phacelia lutea* var. *mackenzieorum*
- Senecio erterae*
- Trifolium owyheense*

Outcrops of Deer Butte, Bully Creek, Chalk Hills and/or Glens Ferry Formation.

- Astragalus cusickii* var. *sterilis*
- Astragalus nudisiliquus*
- Chaenactis cusickii*
- Cryptantha propria*
- Eriogonum calcareum*
- Eriogonum chrysops*
- Eriogonum novonudum*
- Eriogonum salicornioides*
- Penstemon miser*

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Are Herbaria Still Relevant in the 21st Century?

By Walter Fertig, Moenave Botanical Consulting, Kanab, Utah

Originally published in *Sego Lily*, Utah Native Plant Society newsletter, Winter 2016.

The oldest herbaria date to the Middle Ages when European physicians first learned that dried and pressed plants could retain their color and appearance for decades if properly preserved. Initially specimens were bound in books to provide doctors with a handy reference for identifying the sources of herbal medicines. Over time it became more convenient to keep specimens on loose sheets that could be arranged in various ways. Nascent taxonomists could even begin to organize their collections according to patterns. Linnaeus, the creator of our modern taxonomic system, had a home herbarium that he could rearrange as he saw fit, and other scholars kept personal collections too. Ultimately, small collections coalesced into larger public repositories, often housed in major universities or botanical gardens. In the 19th and early to mid-20th centuries, herbaria were at the forefront of research into the genealogical relationships of plants based on outward appearance (morphology) and internal anatomy.

Such work continues to this day, but has long been overshadowed by more sophisticated techniques and more modern analytical tools. Not surprisingly, traditional herbarium taxonomy has declined in prestige and funding. In the past twenty years one herbarium in seven has closed due to budget cuts or shifts in academic priorities (Deng 2015). In most cases, these collections have been absorbed by larger institutions, such as the recent merger of the University of Missouri Herbarium with the Missouri Botanical Garden. More ominous is the growing trend of vacant positions not being refilled, degree programs in botany disappearing, and reduced hours of operation. Recently, a major National Science Foundation program that has traditionally

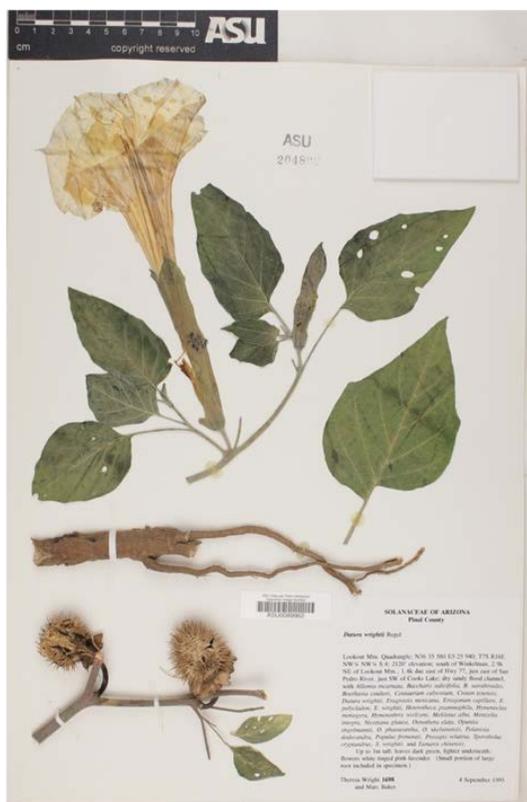
funded specimen digitization and large capital expenses (such as new cabinets) was suspended.

If herbaria are to survive, those of us who care about them need to do a better job of demonstrating their value to society. While conventional taxonomic research remains important, herbaria are also increasingly relevant in the fields of ecology, biogeography, and conservation biology. Specimens are also valuable for building public appreciation of plants and of botany in general. Rather than hiding our specimens behind cabinet doors, we need to make them more accessible, especially digitally.

Each herbarium sheet has three main pieces of information. The most obvious is the physical specimen itself: stems, leaves, roots, flowers, and fruits. From these, researchers can determine the identity of the species and recognize the diversity among individual plants within and between populations. Measurements and observations of specimens are the basis for species descriptions and identification keys. Additional information can be gleaned from the internal chemistry of the specimens, especially genetic data from nuclear and organelle DNA. Such data can be used to reconstruct phylogenetic relationships among species, genera, and families. Perhaps the most useful information, however, comes from the specimen label which records the name of the species (and any subsequent changes or corrections), the collector, the date of the collection, locality, and other data on habitat, elevation, associ-

ated species, or abundance. These three datasets are the foundation of taxonomic research and can be especially useful in studies of ecology and conservation biology.

For taxonomists, the most important specimens are the type collections, which provide the basis for species names and taxonomic concepts. When a new species is



Herbarium specimen of *Datura wrightii* (Sacred datura or jimsonweed) from the Arizona State University herbarium. Such specimens are useful to taxonomists studying the range of morphological variation across plant populations. The locality information on the label, especially if mapped in a digital database, is increasingly important for predicting species distributions, determining gaps in protection, and tracking the spread of weeds or response of species to climate change. More importantly, specimens are beautiful and build public appreciation for plants and botany.

discovered, a holotype is designated and deposited in an herbarium to serve as the standard (or archetype) for which all other individuals of the species are compared. A recent study found that nearly one-quarter of all newly documented species were already found within existing herbarium collections but had been initially misidentified or unidentified (Bebber et al. 2010). The authors even suggested that as many as 70,000 undescribed plant species might still be lurking within the world's herbaria.

Herbarium specimens can also be a source for new records of pathogens and parasites. In the 1990s, the late John Baxter, a retired mycologist, discovered over 30 Wyoming state records of rust and smut fungi growing on plant specimens in the Rocky Mountain Herbarium at the University of Wyoming. One of these was *Puccinia yosemitana*, a rust from California and Colorado that was new to Wyoming. Baxter found it growing on a specimen of Opal phlox (*Phlox opalensis*) that I had collected in southwestern Wyoming a few years earlier. I had failed to notice the yellow-orange fruiting structures when making the voucher as part of a rare plant survey.

Specimen vouchers (deposited in herbaria) are important for documenting new occurrences of rare and unusual plants. Compared to observation records or photographs, physical specimens are easier to corroborate if there is any debate about a report's authenticity. This can be especially important in ecological studies or when developing checklists for protected areas, such as national parks or wildlife refuges.

In the past, users of specimen data had to either visit herbaria in person or arrange to borrow material. With the advent of digital databases, herbarium records are now readily available around the clock and from any home, office, or mobile device that has internet access (even in the field). Online databases include standard label information (species name, collector, date, locality, habitat) and often have maps of collection sites and digital images of the actual specimen. These data can be queried in numerous ways to create local or rangewide distribution maps or customized species lists. Individual herbaria are increasingly pooling their digital data into regional and national networks, such as SEINet (Southwest Environmental Information Network), the Consortium of Intermountain Herbaria, or the Consortium of Pacific Northwest Herbaria, allowing users to access millions of records with ease. Other digital products, such as interactive keys, image libraries, and links to original botanical literature, are greatly increasing the utility and scope of herbarium information.

Brick-and-mortar herbaria (and the professional staff needed to maintain them) are still vital for plant identi-

fication services. Potential clients range from farmers and ranchers, government biologists, and industry consultants to home gardeners, amateur naturalists, and school children: essentially anyone who might need assistance identifying mystery plants. Sometimes herbarium staff are asked to provide expertise on plant fragments rather than whole specimens. Such "forensic botany" can help archeologists interpret prehistoric sites, paleoecologists infer past climates, and law enforcement officers solve crimes.

Herbaria can also be thought of as vast genetic libraries. Rather than having to travel around the world to gather samples, researchers have millions of collections at their disposal, already identified to species and with collection dates and localities provided. In the case of extinct or protected species, herbarium specimens may be the only material available for study. Older specimens can offer a window into changes in genetic structure in populations and evidence of ongoing evolution.

There have been challenges in utilizing herbarium collections in molecular research. Initially researchers had difficulty extracting sufficient quantities of DNA from old collections. DNA may have been altered if specimens were pickled or dried improperly. Some species are reluctant to give up their genetic resources, especially succulents or plants rich in sap or resins.

Recent advances in molecular techniques are resolving many of these problems. A recent study (Choi et al. 2015) found no relationship between the age of a specimen and the purity of DNA that could be extracted and later amplified. Ames and Spooner (2008) used DNA from 200-year old herbarium specimens of Irish potato in Europe to match unique genetic markers with their source populations in the Andes and lowlands of Chile and help determine the multiple points of origin of this important crop plant.

Herbarium specimens can also be time capsules of past environmental conditions. Atmospheric carbon dioxide levels have been recorded in herbarium specimens collected in the late 1700s and compared with recently collected plants to document changes in the concentration of greenhouse gases since the industrial revolution (Bonal et al. 2011). Lichens are particularly useful bioindicators of air pollution and historical collections have been used by researchers to trace the decrease in air quality and subsequent changes in the lichen flora in the Los Angeles area over the past century (Riddell et al. 2011).

Locality data from herbarium specimens are also useful in studying the spread of invasive weeds. One example is Stinknet (*Oncosiphon piluliferum*), a

Continued on Page 8

malodorous annual weed from South Africa that recently became established in the American Southwest. Based on herbarium collections, this species was first collected in Los Angeles and Phoenix in 1981. It remained uncommon and infrequently documented until about 2005, when populations began to appear regularly in southern California and central Arizona. At first the invader was a mystery, but again herbaria demonstrated their worth by providing weed specialists with the correct identification. Information from collections is marking the steady progress of this species as it marches south towards Mexico.

Digital locality data from herbarium specimens can be used in modeling the potential distribution of weeds, rare plants, and other species of high management interest. At the University of Wyoming, I used more than 325,000 digital records in the Rocky Mountain herbarium database to identify patterns in the presence and inferred absence of 200 randomly selected plant species with a mix of environmental variables (average monthly temperature and precipitation, bedrock geology, soil type, vegetation, etc.). The resulting models identified areas of likely and unlikely habitat that could then be checked to determine if the target species was present. This study resulted in the discovery of several new populations of critically endangered plant species.

Locality data from herbarium collections can also be used to identify gaps in the network of protected areas, such as national parks, wilderness areas, special botanical areas, and Nature Conservancy preserves. In Wyoming, 10.6% of the state is "protected", but these areas tend to be concentrated nonrandomly in the northwest corner of the state and at high elevations. Based on herbarium records, I found that 18% of Wyoming's plant species were completely absent from these protected areas. Unprotected plants tended to be restricted to specific habitats and regions (such as deserts, grasslands, and the Black Hills) that were not well represented in the existing protected area network. In addition, rare species were more than twice as likely to be unprotected as common species. These results should be helpful in targeting specific areas and species in need of conservation attention (Fertig 2011).

Making herbaria relevant again

Hopefully the preceding examples have demonstrated the ongoing value of herbaria in contemporary research on plant taxonomy, ecology, and conservation biology. Herbarium supporters need to share this message with the public, our academic colleagues, and those who control research funding. I recommend the following actions:

1. Stop using images of scientists standing in front of open herbarium cabinets to illustrate our work (visit any herbarium home page and you will see what I am referring to). Our focus needs to be on the contents of the cabinets and not the cabinets themselves!

2. Expand the reach and quality of digital specimen databases and keep access to them free.

3. Provide technical services to the public, such as help with plant identifications, and do so with a smile.

4. Support and participate in research across disciplines and at local, state, regional, and international scales (no working in isolation!).

5. Create a positive environment for students, colleagues, and visitors.

6. Hold more outreach events with the public. Remember that people really like plants and are just as fascinated as we are by their diverse forms, colors, and beauty. There is something about seeing (and holding) a plant in person, even if dried and pressed, that is far superior to a photograph or video. Engaging visitors is a great way to recruit potential volunteers to mount, database, and file specimens and builds crucial support for the work that we do and love. •

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Fungus Flowers Fool a Botanist

By Peter Lesica, Conservation Biology Research, Missoula, Montana

Adapted from an article that originally appeared in *Kelsey*, newsletter of the Montana Native Plant Society, Spring 1998.

Buttercups are usually the first flowers on the grassy hills around Missoula, Montana. They rarely occur on the stony ridgetops, but prefer the deeper soils of the slopes and flats. Often at this time of year my eye will fall on a yellow spot of color among the green foliage, and I'll bend over to see what it is, only to find it's not a flower at all. It's the right size for a buttercup, but it looks like a cluster of light yellow leaves covered with small crystal-line pustules.

This plant is our common rockcress (*Arabis* or *Boechera holboellii*) in the mustard family. Rockcress usually produces long stems with numerous white flowers later in the spring. But this plant is infected with a rust fungus in the genus *Puccinia*. Infection of rockcress occurs in the fall, and the fungus grows in the host plant during the fall and winter, altering the buds that produce next year's growth. In the spring, the plant is stunted with numerous short leaves instead of a normal, tall flower stem. Near the tip of the stunted stem the leaves are clustered and yellow with the reproductive structures of the fungus. A sugary nectar and even a mild scent are produced by the fungus at the same time. These yellow clusters of leaves that produce nectar are called pseudoflowers. Flies and sometimes even bees are attracted to these pseudoflowers, and these insects are required for sexual reproduction between different strains of the rust fungus occurring in the same area. Pseudoflowers serve the same function for the fungus as real flowers perform for plants; they affect mating. But since the fungus can't produce flowers of its own, it resorts to forcing its host to do the job for it. But that's only part of

the story. Barbara Roy studied buttercups and the buttercup-like pseudoflowers of rockcress where they occur together in Colorado.

She found that more insects visited the true buttercups when they were with rockcress pseudoflowers than when they were with other buttercups. And more insects visited the fungally-produced pseudoflowers when they were with buttercups. Each receives more insect visits when in the



company of the other than by themselves. Roy found that buttercups produce a large pollen reward for visiting insects but have little nectar. On the other hand, the fungal pseudoflowers produce no pollen but have copious nectar. Apparently the pollen and nectar rewards together are more attractive than either alone. The more visiting insects, the more likely is successful mating for both buttercups and fungus. In this unlikely way, the buttercup and fungus help each other produce more offspring.

Nature sometimes makes strange bedfellows. The fungus can infect the hapless rockcress and fool the insects, but it won't fool me again... at least not until next year. •

Additional reading: Roy, B. A. 1994. The effects of pathogen-induced pseudoflowers and buttercups on each other's insect visitation. *Ecology* 75: 352-358.



Idaho Mystery Plant

This photo was taken by Lisa Harloe in a moist graminoid-dominated meadow in east-central Idaho's Little Lost River Valley. What is your guess for this plant? The answer will be revealed in the next edition of *Sage Notes*. The Idaho Mystery Plant in the March 2017 issue was smooth blazingstar (*Mentzelia mollis*), a species in the Loasaceae family (Loasaceae) that occurs on sparsely vegetated, heavy clay slopes and bluffs derived from volcanic ash. Its main distribution includes Owyhee County, Idaho, and adjacent Malheur County, Oregon. Disjunct populations also occur in western Humboldt County, Nevada. Have an Idaho Mystery Plant to share? Send it in to the editor:

sage-editor@idahonativeplants.org.

— Michael Mancuso

Aase's Onion Rescue in the Boise Foothills

By Michael Mancuso, Pahove Chapter

Aase's onion (*Allium aaseae*) is a low-growing perennial plant known only from southwestern Idaho, occurring primarily in the Boise to Emmett Foothills, but also with a few disjunct populations in the Weiser area. Its display of small, vivid pink flowers make it one of the more striking wildflowers to welcome the region's early spring season each year. Aase's onion occupies dry, open,



Michael Mancuso points to the area in the Boise Foothills where the new transplants are located. Photo by Jody Hull.

relatively sparsely vegetated, well drained sandy soil areas, usually within bitterbrush or bitterbrush–big sagebrush plant communities. Portions of multiple occurrences have been destroyed in recent decades, mainly due to urban development in the Boise Foothills area. Aase's onion is on the INPS state rare plant list and a species of conservation concern because of its restricted geographic range; the documented loss and degradation of its habitat; the vulnerability of its habitat to threats such as wildfire, weed invasion, sand mining, and foothills development; and the location of most occurrences on private land, where conservation options are often limited.

In spring 2016, an occurrence of Aase's onion was discovered in the Boise Foothills on private land slated for a new housing development. With permission from the developer, INPS members Karie Pappani, Kris Barrash, Peggy Faith, and Mike Mancuso salvaged approximately 1000 Aase's onion bulbs from the property. This had to be done in a timely manner while the plants still had flowers because all above-ground portions quickly disappear from sight until next year upon seed set. The bulbs were dug up, placed in pots, and covered with sand collected on-site.

An arrangement was made with the Land Trust of the Treasure Valley (LTTV) to conduct a transplant experiment with a subset of the collected Aase's onion bulbs. The experiment would take place at Harrison Hollow, an open space reserve in the Boise Foothills managed by LTTV and located within 1 mile of the original collection site. A total of 400 Aase's onion bulbs were transplanted in October, 2016 by Eric Willadsen with LTTV, and INPS members Kris Barrash, Colleen Greenwalt, Peggy Faith, and Mike Mancuso. The bulbs varied in size from approximately lentil-size to larger than a pea. Bulbs were buried several inches deep into a series of small sandy openings over an approximately 0.1 acre area. Twenty bulbs were planted in each sandy patch, with each patch mapped in reference to a nearby fencepost. Transplanting occurred just downslope of a popular trail and a split rail fence built to protect a small population of Mulford's milkvetch (*Astragalus mulfordiae*)—another plant species of conservation concern that occurs in the Boise Foothills area. And then it was time to wait until the next spring.



Newly transplanted Aase's onion in bloom. Photo by Jody Hull.

Eric Willadsen, Kris Barrash, Colleen Greenwalt, Jody Hull, and Mike Mancuso returned to the transplant site in early April 2017 to assess the success (or not) of the experiment. We tallied a total of 260 Aase's onion plants, accounting for 65% of all the bulbs planted several months earlier. At least a few Aase's onion plants were found in or near most of the mapped patches. However, a few patches had no plants, and several plants showed up in places not mapped. It was great to see the transplant had some success. All above-ground evidence of Aase's onion was absent upon a return visit to the transplant site a couple weeks later. Perhaps the ephemeral seasonal appearance is part of the anticipation and allure of Aase's onion. What will we find next year? •

INPS NEWS

2017 ERIG Grants Awarded

The INPS Education, Research and Inventory Grant (ERIG) Program for 2017 awarded a total of \$2700.00 to five recipients. We want to thank the Idaho Rare Plant Conference for donating funds to help with ERIG grants and also all the individual members who give extra contributions to ERIG.

1) Idaho Native Plant Sign Improvement Project for Orton Botanical Garden. The project's goal is to improve signage and add signs within the garden. This would include labels for the Idaho natives among the botanical garden's 400+ plant species and varieties. Individual labels will include the plant's common, scientific and family names, with its geographic distribution. Larger plaques explaining habitats within the garden will also be included.

2) Reconciliation of the Wellner Collections. Charles A. (Chuck Wellner (1911-2001) former USDA Forest Service employee and charter member of the White Pine Chapter) was instrumental in the initial exploration and eventual establishment of highly significant conservation sites including research natural areas, special interest botanical areas, and other natural areas throughout Idaho. The objectives of the proposed Reconciliation of the Wellner Collections project are to (1) reconcile information shown on Wellner's natural area plant species lists with herbarium records for Wellner's plant collections and (2) (to the extent possible) annotate herbaria collections to refine species identification (e.g., many collections of *Artemisia tridentata* are not identified to subspecies).

3) Collister Elementary School Garden, Boise, Idaho. A garden is being started at Collister elementary to be called the Collister Legacy Garden. The school is partnering with Edward's Greenhouse, located nearby. The garden will teach students how to grow vegetables but will also grow native plants as well. The school is within ½ mile of the sagebrush foothills of north Boise, so learning about native plants in the high desert will be beneficial. This fits in the 3rd and 4th grade Social Studies and Science curriculum as these plants were found along the Oregon Trails. While the plant purchases have already been funded the school is asking for money to provide gardening tools for the students.

4) Ponderosa State Park Native Plant Restoration Project. The University of Idaho McCall Outdoor Science School (MOSS) is restoring degraded areas of the state park. This project targets the southern half of the park near the activity center and at the lily marsh. The

objective is to decommission unwanted trails to reduce impacts on existing natural plant communities and, to plant native wildflower and shrub seedlings to improve biodiversity and restore natural ecosystem functions. The project would allow the MOSS program to continue utilizing the area for education and provide additional educational opportunities focused on native plants and the importance of environmental stewardship. The award will allow them to purchase native herbs and shrubs.

5) A taxonomic revision of the state sensitive species complex. One of the first steps to understanding and conserving biological diversity is to document the presence of morphological and genetic variation across the landscape, and if possible across time. Michael Ottenlips, graduate student at Boise State University, is planning to construct an evolutionary tree and potentially describe new rare species in the *Lomatium packardiae* (Apiaceae) complex in western North America. The funds received from ERIG will be used for travel costs related to field research.

The ERIG committee is excited for the diversity of the grants funded this year. From native gardens at a school, signing at a botanical garden to restoring native plants at a state park, and biological research on a specific group of *Lomatium* as well as taxonomic herbarium work, all of these projects fall within the education and research of native plants in Idaho. All projects funded are responsible for submitting an article to Sage Notes describing the purpose and results of the projects. Stay tuned in the years to come to learn more about the success of these projects.

If you enjoy knowing that our society is working hard to promote native plant awareness and conservation within our state, please consider giving to the ERIG program on a monthly or yearly basis. With automatic payments from PayPal, it is easy to contribute to our worthy cause. Thank you to members, LaMar and Rosalie Orton, Gerry Queener, Jessica Irwin, Janet and Ed Bala, Kris Barrash and Chris Treccani for your donations in the first quarter of 2017.

Thank you to everyone in our society for your interest in native plants and for your continued support of the ERIG program.

Respectfully,
Janet Bala
ERIG Chairperson

Pahove's Native Plant Sale - From Pots to Truckloads

By Caroline Morris, Pahove Chapter

Has your INPS chapter held or considered a native plant sale? Read about Pahove's experience to see whether it has useful lessons for you.

In the late 1980s, Pahove member and INPS' computer and website advisor Paul Shaffer, suggested that a native plant sale would be a real money-maker for our INPS chapter. Without his persuasive nudging, then Pahove president Ann DeBolt believes this now very successful annual late April Native Plant Sale probably never would have started. During the Sale's three-decade history, organizational, venue, and leadership changes have changed it substantially.

Until 1990, Ann and others dug native plants grown in Pahove members' yards, particularly Joe Duft's and Bob Steele's. They sold the plants in recycled containers on Earth Day at a booth shared with the Idaho Conservation League located at the Old Penitentiary in Boise. Lacking expenses, all income from the sale was profit. Then the owners of Buffalo Berry Farm in McCall attended the Pahove native plant event and asked to be the Sale's commercial native plant vendor, providing more variety, consistent quality, larger quantities, and new or unusual botanical treats. Buffalo Berry was the exclusive vendor for years, but as customers and demand for inventory increased, the Sale added other vendors, including Plants of the Wild, of Tekoa, Washington. More recent sources for Idaho-grown native plants are Draggin' Wing Farm and Xeric Gardening of Boise.

Although staying in Boise, Sale locations changed over time too—from the Old Penitentiary to Barber Park, Hyde Park, and Julia Davis Park. Eventually the crowds became too chaotic for these venues. In 2005 Susan Ziebarth, a 15-year INPS member and fulltime Idaho Fish and Game employee as Landscape and Facilities Coordinator at MK Nature Center (MKNC) in Boise, offered use of the MKNC, where the Sale finally found a permanent home. Two years ago, anticipated rain moved the Sale from its prior outdoor location into an MKNC shed/garage that became an ideal weather-proof facility, with the added benefit of easier overnight security. The annual date of the Sale remains close to Earth Day, when gardening sounds appealing.

After assisting Ann DeBolt for three years, Susan assumed the "Plant Sale Czar" position in 2008. In 2011, the Pahove Board approved Susan's implementing a "Member's Only" sale the day before opening the Sale to the public. This gives current INPS members more time to calmly select and buy plants, compared to the crowded



Ready for business at the 2017 Pahove Chapter Native Plant Sale. Photo by Jody Hull.

public sale. It also encouraged new INPS memberships. "Member's Only" Sale admission requires current INPS membership status, creating a busy forced renewal opportunity. Typical Sale hours are Friday 5-7 pm for INPS members and Saturday 10 am-1 pm for the public.

Preparing for the Sale requires a tremendous amount of time and effort by Susan. Sometimes she may think discontinuing the Sale would be wonderful. In addition to her "day job" with IDFG, Susan serves Pahove as its sales manager, meetings venue coordinator, and INPS P.O. Box Mail Retriever/Distributor. Nevertheless, Susan persists with good cheer. She is convinced that native plants sold at the Sale enhance urban wildlife and pollinator habitat, making the effort worthwhile.

The 2017 Sale sold more than 3000 plants, ranging in size from small tubes to 3 foot tall shrubs and tree saplings. Most Sale plants are nearly impossible to find at local nurseries, causing customers to return year after year. One Sale volunteer wryly observed that they must return to replace their die-offs.

After extensive advance planning, Susan works night and day for at least the month before the Sale creating spreadsheets to determine which grower has which plants, placing orders with those growers, designing and printing Point of Sale species signs, plant labels, posters, fliers and banners. Then there are the all the "last minute" details that this complex event involves. Other tasks for Susan include unloading a large, early delivery of plants into the MKNC greenhouse. Then potting and keeping these plants alive until the Sale date. Susan also maintains unsold plants from the previous year, recruits and coordinates the Sale's valuable volunteer manual

labor force, arranges for a security guard, negotiates a truck rental for plant pickups, prepares a detailed plant availability list and planting guide for the chapter website page, printing roughly 3000 plant labels, and more.

This Sale could not happen without the talented and dedicated volunteer work force of Pahove members, Idaho Master Naturalists, friends and spouses, and a few well-instructed interns. It must all come together during the "Friday Frenzy" set-up day. This requires arranging dozens of tables, unloading all the plants from the MKNC greenhouse and the other suppliers, inserting labels for each plant, and placing plant trays on the appropriate tables (sun, shade, firewise, etc.). Volunteers advise customers about suitable plants and combinations during the entire Sale. Afterwards, volunteers need to store equipment and place remaining plants wherever Susan directs. Many Pahove members have worked at the Sale for years, enjoying the camaraderie and tasty snacks, even when doing grungy tasks.

Transferring leftover plants, deciphering membership forms, counting money, paying state sales taxes, and finalizing the accounting wraps up the Sale for another year. Counting the money is fun! Susan is a rapid cash-counter from her past commercial sales experience. Our recent Sale received \$5505 in \$5 bills alone—that's 1101 individual bills to count accurately. We miscounted by just one \$5 bill, according to our credit union's official calculation.

Profits from the Sale go in many directions, including 25% to MKNC, an annual Education & Enrichment

Award enabling a Pahove member to attend a selected plant conference, college student intern payments, community plant donations, Rare Plant Conference support, and plant education resource materials.

Pahove is incredibly fortunate and grateful to have benefitted from Ann DeBolt's and Susan Ziebarth's amazing Plant Sale leadership efforts. All sparked by Paul Shaffer's wise suggestion many years ago. Of course, we hope to see all the volunteers again next April. •



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INPS Chapter News

CALYPSO CHAPTER

When: Meetings are the first Wednesdays of March, April, May and October at 7:00 pm. Field trips take place during the spring, summer, and early fall months.

Where: Meetings are held in the conference room of Idaho Department of Fish and Game, 2885 W. Kathleen Ave., Coeur d'Alene.

Contact: Derek Antonelli, ds.ca.antonelli@gmail.com

Upcoming events:

June 17: Coeur d'Alene River/Mountains plant hike. Meet at 8:00 am to carpool from Walgreen's at US 95 and Appleway. Stage for hike at Bumblebee Campground at 9:00 am.

June 22: Idaho Master Naturalist plant hike. Meet at Rapid Lightning Creek Wildlife Habitat Area parking lot at 5:00 pm. Contact Derek Antonelli for details.

July 8: Antoine Peak Conservation Area hike/survey. Meet at 8:00 am to carpool from Walgreen's parking lot.

August 10: Idaho Master Naturalist plant hike. Meet at 9:00 am at Avista recreation site at Highway 200 and Trestle Creek Road. We will caravan to a mountain lake hike. Contact Derek Antonelli for details.

August (TBD): Tentative plant hike to Hager Lake and Huff Lake.

October 4: Tentative presentation for Chapter meeting - Plants of ponderosa pine/Douglas-fir forest habitat types.

October 17: North Idaho Rare Plant Working Group meeting, 9:30 am to 3:30 pm, location TBD.

Previous events:

May: Bob Wilson of the Cedar Mountain Perennials Nursery provided a very interesting talk on the propagation of native plants at the October 2016 Calypso Chapter meeting. This May, the Chapter took the opportunity to tour the nursery and see Bob's propagation techniques in operation.



Calypso Chapter tours Cedar Mountain Perennials Nursery owner Bob Wilson in green shirt. Photo by Derek Antonelli.

Also in May, the Calypso Chapter hiked the newly established Upper Falls Community Forest in Post Falls. The Upper Falls Community Forest adds 438 acres and two miles of frontage along the Spokane River to the existing 58 acres of Quiln Park. The forest is home to many beautiful native plant species.

LOASA CHAPTER

When: Meetings are held the third Thursday of each month at 7:00 pm.

Where: Taylor Building, Room 248, College of Southern Idaho, Twin Falls.

Contact: Bill Bridges, bridgesbill34@yahoo.com

PAHOVE CHAPTER

When: Meetings are held on the second Tuesday of each month from September–April at 7:00 pm. Dates and times are occasionally subject to change. Upcoming meeting information is sent to members via postcard and/or email. Events are also posted on the Pahove Chapter page of the INPS website:

<http://idahonativeplants.org/local-chapters/pahove/>

Where: The MK Nature Center Auditorium, 600 S. Walnut Street, Boise, Idaho

Contact: For more information about Pahove Chapter activities please visit the Pahove Chapter page of the INPS website, or email Karie Pappani at pahove.chapter.president@gmail.com

Upcoming events:

The Pahove Chapter wrapped up another season of fantastic talks and presentations in April. We will kick off the 2017/2018 season in September with our annual pizza party at Idaho Botanical Garden. Date/time TBD.

Previous events:

April: Pahove's annual Native Plant Sale on April 28-29 was a big success. Approximately 3000 native tree, shrub, forb and grass plants found new homes in the Treasure Valley area thanks to the plant sale. In addition, a dozen new members joined INPS.

May: In late June 2016, a human-caused wildfire burned approximately 2500 acres in the Table Rock area in the Boise foothills. In late May, Pahove members toured and learned about the fire restoration that began last autumn. Our well-informed guide was Martha Brabec, an ecologist who is the Foothills Restoration Specialist with Boise's Department of Parks & Recreation. She is involved because the fire burned 164 acres owned by the City of Boise (including all the trails we traveled). Other landowners included the Idaho Department of Lands and

the Idaho Department of Fish and Game. These organizations have been coordinating restoration efforts.

The two evening hikes used different scenic trails, one was on a hilltop, the other on a hillside. Common themes discussed by our guide were: "fertile islands" (the nutrition-rich burn zone surrounding blackened shrub skeletons); planting 3500 new sagebrush and antelope bitterbrush shrubs and additional hoary asters by 500 volunteers; surprising rejuvenation of existing native plants; fire resistance of hackberry trees; heavy invasive weed growth; minimal success with both broadcasting seeds and herbicides; and plans for using Zoo Boise's \$100,000 grant. All participants became more plant-firewise and weed-smarter on these very informative tours.



Martha Brabec discussing post-fire restoration efforts for the Table Rock area. Photo by Vicki Henderson.



Pahove members on a tour of the post-fire Table Rock restoration area. Photo by Vicki Henderson.

Board Position Opening:

Pahove chapter is seeking a new board president. Current president, Karie Pappani, has served the chapter exceptionally for 5+ years, and the time has come to select her successor. Interested individuals are encouraged to contact the board at pahove.chapter.president@gmail.com

SAWABI CHAPTER

Contact: Paul Allen at pokyalen@hotmail.com

Upcoming events:

During summer months, the Sawabi Chapter holds Monday night plant identification walks and Saturday field trips to different sites in southeastern Idaho. The summer schedule can be found on the Sawabi Chapter

page of the INPS website:

<https://idahonativeplants.org/sawabi/> and click on "2017 Field Trip Schedule Here".

Previous Events:

April 15: The Sawabi Chapter participated in the Pocatello Environmental Fair on April 15. We provided information on the Idaho Native Plant Society, including a schedule of our plant walks this summer. Volunteers handed out plants started by Steve Love from the University of Idaho Extension Service and from the gardens of various members. Children participated in a plant identification game to earn a "passport stamp" from our booth as a requirement to enter a prize drawing.

April 22: Several chapter members "Marched for Science" on April 22, and participated in an after-event presentation. The public was invited to peer through microscopes and discover the beautiful details of individual flowers.

UPPER SNAKE CHAPTER

The Upper Snake Chapter is currently inactive.

Contact: Rose Lehman, jojorose@cablone.net

If anyone is interested in reviving the chapter, they are welcome to contact Rose.

WHITE PINE CHAPTER

When: Meetings are held once a month except during the summer. Field trips occur most any month. Please check the chapter website at www.whitepineinps.org for events which may be scheduled or finalized after *Sage Notes* is printed; or email the chapter officers at whitepine.chapter@gmail.com

Where: Great Room of the 1912 Building, 412 East Third St. in Moscow (between Adams and Van Buren).

Contact: INPS, White Pine Chapter, PO Box 8481, Moscow, ID 83843 or whitepine.chapter@gmail.com

WOOD RIVER CHAPTER

When: Meetings are held various weekday evenings beginning at 7:00 pm.

Where: Meetings are held at the Sawtooth Botanical Garden, located three miles south of Ketchum, on Highway 75 and Gimlet Road.

Contact: Cynthia Langlois at cplangloisACRP@msn.com for information about fieldtrips and presentations. Also, check the Sawtooth Botanical Garden website: sbgarden.org for updates on presentations. •



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- Sawabi (Pocatello)
- Upper Snake (Idaho Falls)
- White Pine (Moscow)
- Wood River (Ketchum/Sun Valley)
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Memberships run calendar year. New memberships enrolled after June 1 include the following year. **Renew or join online:** <https://idahonativeplants.org/membership/>

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