

Kelseya

Newsletter of the Montana Native Plant Society



Kelseya uniflora
ill. by Bonnie Heide

Fabulous Field Trips

Geiger Lakes Hike

By Jon Reny, Western At-Large

SIX INTREPID SOULS SHOWED UP FOR THIS YEAR'S "Exploding Car Battery" field trip in July, so named because of an incident that occurred during the first of these outings. The Geiger Lakes area within the Cabinet Mountain Wilderness was our destination. The weather was perfect at the start; some clouds moved in, making us a little concerned, but soon moved on. We saw 59 species (24 families) of plants in bloom. There were eight different asters (*Asteraceae*), seven heaths (*Ericaceae*) and five each of lilies (*Liliaceae*), roses (*Rosaceae*) and figworts (*Scrophulariaceae*).

Peter Lesica once again shared his knowledge, not only of plant identification but also of plant ecology, physiology and genetics. Peter discussed current and past research on specific species to the group's great enjoyment.

We hiked into the upper lake and had lunch with the mosquitoes. Then we took a short side trip along the lake's outlet to an overlook. This provided great views of Lower Geiger Lake and will be remembered as a future lunch spot! After taking pictures, identifying peaks and some exploring, we returned to Upper Geiger Lake and walked around the perimeter to botanize in some open areas we had seen from our lunch spot. While we identified

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Above: Lunchtime at Upper Geiger Lake.
From left, Renee Rose, Jon Reny, John Pederson,
Larry Phelps, Chris Reichert and Peter Lesica.
Photo by Peter Lesica



Left: John Pederson stands at the lookout
above Lower Geiger Lake in the Cabinet
Mountain Wilderness.
Photo by Jon Reny



Chapter Events

Calypso Chapter

Info: Catherine Cain at 498-6198, nativeplants@montana.com.

Clark Fork Chapter

Info: Anne Garde at 721-7627, anniegarde@yahoo.com.

Thursday, October 13, 7:00 p.m. Native Missoulian, professional mycologist and author of several books on fungi, Frank Dugan will be in town to take us "Into the Wild World of Fungi: A Mycogenic Perspective on Nature and Society." Frank's talk will be followed by a mushroom field trip the following Saturday. Rm L09, Gallagher Business Bldg., UM Campus.

Saturday, October 15, 9:00 a.m. We'll hope for rain and go with Frank Dugan into the deep woods northwest of Missoula (Sixmile, Trout, Cedar or Ward creeks) to identify as many different mushrooms as possible. Easy hiking on nearly level ground. We'll carpool from the parking lot of McKenzie River Pizza just north of the I-90/Reserve Street interchange.

Thursday, November 10, 7:00 p.m. Retired forester Cathy Stewart recently bought a second home near Cabo San Lucas. Now she wants to make us jealous with stories of "Charismatic Megafauna of Baja California." Rm L09, Gallagher Business Bldg., UM Campus.

Thursday, December 8, 6:30 p.m. Our annual Christmas potluck will take place in the Del Brown Room in Turner Hall on the UM Campus on the northwest side of the Oval. We hope that parking will be available west of the Gallagher Bldg., in lots or on the streets off Arthur and Connell. Bring plates, utensils and a dish to share. Alcoholic beverages are okay! Don't forget to bring a few of your favorite digital wildflower photos from the summer. Info: Peter at 728-8740 or Kelly at 258-5439.

Monday, January 9, 7:30 p.m. Phil Hahn conducted his Ph.D. research on monarch butterflies in Wisconsin and is continuing his studies here in Montana. He will tell us about "Monarchs and Milkweed: Ecology, Coevolution and Conservation." This is a joint meeting with Montana Audubon. Rm 123, Gallagher Business Bldg., UM Campus (**note different day and location**).

Eastern At-Large

Info: Jennifer Lyman at 656-7869, jenclyman@gmail.com

Flathead Chapter

Info: Tara Carolin at 260-7533, montara96@gmail.com.

Wednesday, October 19, 5:30 p.m. Potluck Dinner, Adventure Sharing, and Planning for the Year. We'll share our activities from the summer and start mapping out events for 2017. There is no formal program, just time

for visiting and catching up. Bring dishes, utensils and food to share. North Valley Community Hall, 235 Nucleus Ave., Columbia Falls. Info: mnps.flathead@gmail.com.

Wednesday, November 16, 7:00 p.m. Program TBA. Come early for a meeting at 5:30 to discuss Chapter business and activities. Program to follow; sack dinners welcome. North Valley Community Hall, 235 Nucleus Ave., Columbia Falls. Info: mnps.flathead@gmail.com.

Wednesday, December 14, 5:30 p.m. Annual Holiday Party. We'll begin with socializing and refreshments, followed by a potluck supper and gift exchange (white elephant or under \$10). Location to be announced. Info: mnps.flathead@gmail.com.

Kelsey Chapter

Info: Bob Person at 443-4678, thepersons@mcn.net.

Maka Flora Chapter

Info: Libby Knotts at 774-3778, rek@midrivers.com.

Valley of Flowers Chapter

Info: Jeff Copeland at 539-6029, jouzelcopeland@gmail.com.

During the fall and winter, the Valley of Flowers Chapter customarily meets the second Tuesday evening of each month, beginning at 7:00 p.m., in Room 108, Plant Bioscience Building, MSU-Bozeman.

Western At-Large

Info: Jon Reny at 334-0459, jreny@kvis.net.

Thanks for the Memories!

Many thanks to the MNPS Calypso Chapter for organizing the excellent Annual Membership Meeting in the rugged and rolling hills of Southwest Montana — always a great place to be out and about. Photos from the various field trips are posted on our website at www.mtnativeplants.org.

Next year's Meeting will be hosted by the Maka Flora Chapter, June 23-25, 2017 in Lambert, Montana. See you there!

News from the MNPS Annual Meeting

Mount Haggin Extravaganza

By Peter Lesica, Clark Fork Chapter

Our group of Montana Native Plant Society people and two penstemaniacs visited the Mount Haggin Wildlife Management Area on Saturday of the Annual Membership Meeting. This ranch, purchased by Montana Fish, Wildlife and Parks to protect habitat for elk and other wildlife, is south of Anaconda at about 6,000 to 8,000 feet and encompasses numerous habitats, including the wet meadows, grasslands, sagebrush steppe and lodgepole pine forests that we explored. We recorded more than 80 species in flower, including two rare plants. This is one of only two sites in Montana for Hooker's balsamroot (*Balsamorhiza hookeri*). We also found a new population of Idaho sedge (*Carex idahoensis*), once considered for listing under the Federal Endangered Species Act. In addition we saw bitterroot in flower, but failed to relocate a population of two-leaf beardtongue (*Penstemon diphyllus*).

Terry L. Spivey, Terry Spivey Photography, Bugwood.org



Hooker's balsamroot (*Balsamorhiza hookeri*)

Outstanding Service Award: Dave Hanna

Submitted by Peter Lesica and Patrick Plantenberg

Dave Hanna, long-time member of the Montana Native Plant Society and Crown of the Continent director for The Nature Conservancy, received special recognition at this year's Annual Membership Meeting. As his nomination described, Dave served as MNPS Vice President from 2004 through 2007. As VP he took charge of investigating the ins and outs of having liability insurance and guided MNPS policy through this sea of tedium. And, as if that weren't enough, Dave also investigated the IRS regulations for lobbying donations by non-profit organizations.

Following four years in that role, Dave served as MNPS President from 2007-2013, an unprecedented three terms! Dave was one of our youngest presidents and was instrumental in dragging MNPS into the digital age. He pushed for having an electronic newsletter option, for having a call-in meeting option, and he helped get the MNPS website started.

Although Dave is a man of few words, his quiet manner turned out to be just what was needed to help settle controversies such as Important Plant Areas policy, Chapter dissolution, and book publication payments. He brought on Cathie Jean as Membership chair and Caroline Kurtz as Newsletter Editor — great choices — both of whom are still on the job. Perhaps most important to other board members, Dave always managed to finish our meeting business in a timely manner. Dave continues to serve as Past President and to lead field trips on the Rocky Mountain Front. Thanks for being a part of MNPS, Dave!



Dave Hanna. Photo by Peter Lesica

2016 Election Results

By Patrick Plantenberg,
Kelsey Chapter

The following results were announced at the 2016 MNPS Annual Membership Meeting at Fairmont Hot Springs:

Karen Shelly retired as Vice President after serving many terms. Thank you, Karen, for your dedication over so many years. **Gretchen Rupp** stepped up and was elected as the new Vice President. Her priority for MNPS is member recruitment, specifically attracting the participation of younger people in the Valley of Flowers Chapter.

Patrick Plantenberg decided to retire from his job as Secretary of MNPS after 20 years. **Rachel Potter** from the Flathead Chapter was elected in his place. A founding MNPS member, Rachel says her involvement continues to be fun and rewarding, and is pleased to step up her activity in the state organization.

Jennifer Lyman, Professor of Environmental Science and Studies at Rocky Mountain College in Billings, agreed to run again for Eastern At-Large Representative and won handily. Jennifer is interested in plant ecology issues on both local and global scales.

The MNPS Board encourages members to consider the option of running for statewide or local Chapter offices in co-chair positions, if that is more appealing. Thank you for supporting MNPS and keep on voting!



President's Platform

*O beautiful for spacious skies,
For amber waves of grain,
For purple mountain majesties
Above the fruited plain!*

When Katharine Lee Bates penned these words in 1913 she must have been looking at Montana in the fall. Fields of autumn grass and the red and orange hues of leaves against the backdrop of mountains are breathtaking.

I feel privileged to witness the the changing seasons through the eyes of a native plant gardener. As leaves turn color, berries and seeds ripen and plants take on different forms. Late season pollinators emerge to forage on goldenrod, gilia, sunflowers, rabbitbrush and beeplant. Their colors seem so vibrant as the sun sinks lower in the sky.

I love autumn and associate it with a time of reflection and thanksgiving. I am especially thankful to the members of MNPS who care so deeply about our native plants and the environment in which we dwell. Your caring and our continued learning and sharing about native plants makes a difference — one person at a time. Happy Fall!

— Kathy Settevendemie

Cattle Gulch Research Natural Area

By Steve and Karen Shelly, Clark Fork Chapter

Given the popularity of the scheduled field trips at this year's Annual Meeting, an extra trip was added to explore the Cattle Gulch Research Natural Area (RNA), located on the Beaverhead-Deerlodge National Forest near Melrose — and it turned out to be a fantastic day!

After an interesting drive to the trailhead that included a ford through Canyon Creek, our enthusiastic group of 27 MNPS members and guests headed up the spectacular canyon along the southwest side of the RNA. The trail passes between sheer limestone cliffs during the first mile, after which the landscape opens up to provide views of the area's unusual vegetation. This RNA primarily was established to protect an extensive example of the mountain mahogany/bluebunch wheatgrass (*Cercocarpus ledifolius*/*Agropyron spicatum*) habitat type, but contains a rich plant species diversity. Along the way, we saw a small herd of bighorn sheep on the steep, southwest-facing slopes, sauntering around in the open grassy areas.

As the canyon widened out, we were able to start exploring the gravelly limestone habitat that is home to several rare and unusual plant species in this part of the state. The highlight of the day was relocating a large population of sapphire rockcress (*Boechera fecunda*). This member of the mustard family is endemic to southwestern Montana, being found only on calcareous substrates in Beaverhead, Ravalli and Silver Bow counties.

Other interesting species we encountered in this habitat included broad-keeled milkvetch (*Astragalus platytropis*), Bessey's locoweed (*Oxytropis besseyi*) and clustered broomrape (*Orobanche fasciculata*). Also of special note were five different penstemon species — *P. albertinus* (Alberta beardtongue), *P. aridus* (stiff-leaf beardtongue), *P. eriantherus* (fuzzy-tongue penstemon), *P. procerus* (small-flower beardtongue) and *P. radicosus* (mat-root beardtongue). And Roger Rosentreter and Ann Debolt, visiting from Boise, helped to document 13 lichen species, all of which were new additions to the plant list for the RNA.

After a leisurely lunch in the shade of some Douglas-firs (*Pseudotsuga menziesii*), we headed back down the canyon. The group agreed that there isn't any better way to spend a sunny, mild June day than in this beautiful corner of Montana, and the addition of 18 native vascular plants to the species list for the RNA gave us an extra sense of accomplishment. At 2,162 acres, there is still a lot of land to explore in the RNA. Hopefully future MNPS trips will help us further document and monitor the plant diversity in this amazing place. Thanks to all who joined us for this special trip!



Broad-keeled milkvetch (*Astragalus platytropis*). Photo by Steve Shelly



Cattle Gulch RNA limestone features. Photo by Steve Shelly

IN MEMORIAM

At the Annual Membership Meeting this June, I learned from Pat Holmgren that Art Kruckeberg died in May. Art was Emeritus Professor of Botany at the University of Washington and founder of the Washington Native Plant Society.

Caroline Clemans (Art's daughter, MNPS member and owner of Grouse Springs Nursery in Polson) brought her dad to Missoula for the first ever meeting of the Montana Native Plant Society in August of 1987. Forty people gathered for a potluck in Bonner Park in Missoula. I heard later that Art's "pep talk" felt like a blessing bestowed on our new group. Art returned in May of 1991 to give a keynote address to 100 people gathered in West Glacier for our 4th Annual Meeting. He spoke about gardening with natives, and when such a terribly distinguished man pronounced a species to be an "elegant plant for your garden" you just knew he had to be right.

The following is adapted and reprinted with permission from the Biology Department at the University of Washington. — Rachel Potter, Flathead Chapter

Arthur R. Kruckeberg

March 21, 1920 – May 25, 2016

By Dick Olmstead, Professor, Department of Biology, University of Washington

Art Kruckeberg, Emeritus Professor of Botany, died at age 96, leaving a rich legacy as scholar, teacher, promoter of gardening with native plants, and conservation activist.

Art joined the Botany Department as an assistant professor in 1950, after completing his Ph.D. at the University of California-Berkeley. He grew up in California and was imbued with all things botanical from an early age; his family owned a publishing house called Kruckeberg Press, which published gardening and horticultural materials. He began graduate school in 1941 at Stanford University, where he had spent the previous summer as a field assistant for the famous botanical research team of Jens Clausen, David Keck and William Heisey.

Due to forces beyond his control, graduate study had to wait. After the attack on Pearl Harbor, Art enlisted in the Navy and was recruited into their language program, where he learned Japanese. He spent the rest of the war years, and a year of postwar occupation, translating Japanese documents and interpreting interrogations of captured Japanese prisoners. To the end of his life, Art was proud of his mastery of the language. I once spent a week with him at a conference in Japan; he could still speak the language — and remembered the plants he had seen — even though it had been more than 40 years since his last visit.

After World War II, he returned to California to start grad school again, this time at Berkeley. He completed his Ph.D. under the supervision of Herbert Mason, with Hans Jenny and G. Ledyard Stebbins on his committee. Mason had recently begun studying the unique flora found on serpentine soils in California. Art's dissertation (*An Experimental Inquiry into the Nature of Endemism on Serpentine Soils*) helped bring the descriptive work on serpentine endemism into the realm of experimental science. Art maintained a research program on serpentine plants throughout his career, writing several books for both academic and lay audiences in addition to a significant body of scientific publications.

Once Art's academic bona fides were well established, he

increasingly devoted his attention to public outreach through writing, the promotion of conservation activism, and pushing for the establishment of environmental legislation to preserve lands for their value to biodiversity. In 1972, he led the movement to create the Washington Natural Area Preserves Act. In 1973, he developed the first list of rare and endangered plants in Washington, and in 1976 he helped found the Washington Native Plant Society. He helped create the Washington Natural Heritage Program within the Department of Natural Resources in 1982 to oversee management of natural area preserves and endangered species, and during those years also served on the U.S. Forest Service commission to identify parcels of federal land to preserve as Research Natural Areas. Art was awarded the prestigious Peter Raven Award for public outreach in botany by the American Society of Plant Taxonomists in 2006.

Art leaves a living legacy in the form of a four-acre garden he and his wife Mareen developed over the course of 50 years in Shoreline, Wash. This is the "type garden" for his most widely known book, *"Gardening with Native Plants in the Pacific Northwest."* This book has turned generations of gardeners on to the joy and conservation value of using our native flora in home gardens. When the book was first published, it won the Governor's Award for outstanding books published by Washington authors. The Kruckeberg Botanic Garden is now a public garden owned by the City of Shoreline and managed by the Kruckeberg Botanic Garden Foundation. Art served on my Ph.D. committee, and I have a debt of gratitude for his support over the years. With news of his death, the many memories of the man who influenced me so take on additional meaning. A legion of friends, colleagues and many who never met him, but were influenced by his work, will mourn his passing.

Gifts in Art's honor can be directed to the Kruckeberg Botanic Garden Foundation or to the endowment he created for Plant Biology in the UW Department of Biology. For more information, contact Lisa at (206) 685-2185, lisatran@uw.edu.

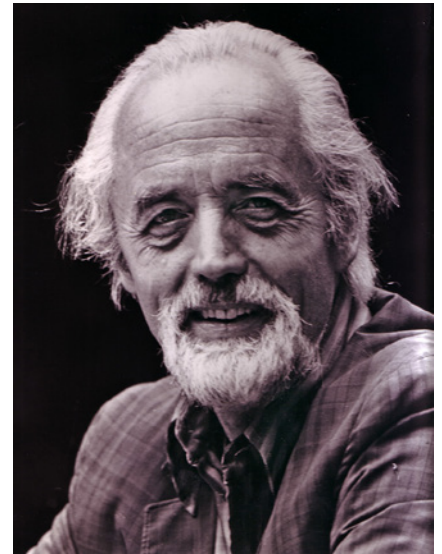


Photo courtesy of University of Washington



2017 Small Grants Open for Proposals

As we say goodbye to this year's wildflowers and gardens, it's time to start thinking about projects for next year that pertain to native plants of Montana.

The Montana Native Plant Society is accepting proposals for 2017 Small Grants for projects or studies that: 1) stimulate research, conservation and educational activities that

foster an appreciation of Montana's native plants and plant communities; and 2) promote native plant conservation through better understanding of Montana's native floras and factors affecting their survival.

Proposals that meet the minimum criteria will be considered for up to \$1,500.

Proposals that demonstrate cooperation with

others and generate data or public support for conservation of native plants in the wild are preferred. The deadline for proposals is January 31, 2017. Check the MNPS website (http://www.mtnativeplants.org/Small_Grants_Program) for more information and proposal submission guidelines, or contact bkuropat@centurytel.net.

Small Grant Reports A Place for Buzzing Minds

By Trinity Pierce, Montana Audubon Center

During the summer of 2015, the Montana Audubon Center Wildflower and Pollinator Discovery Program, with support from the Montana Native Plant Society, provided children many opportunities to plant, experiment and observe the full life-cycles of Montana wildflowers. The Center occupies a 54-acre reclaimed gravel pit. Such post-industrial spaces are common in our region. Understanding the ramifications of the severe disturbance of such land use is critical to ensuring that our restoration efforts are appropriately context-based and sustainable. This program is instrumental in bolstering the species diversity through a series of native Wildflower Patches (patch size = ~650 square feet).

Our program began in late spring as 45 children aged eight to 12 worked together in small groups to design maps with potential plant arrangements. What started as an exercise in mapmaking and wildflower identification quickly grew into a buzz of young minds coordinating how best to translate the circles on paper into a living community of native wildflowers. This proactive level of engagement is clearly evidenced by the adjustments made to the Wildflower Plug chart (see illustration) to suit the needs of the young botanists.



Plot map and species list, created by kids in the Wildflower and Pollinator Discovery Program.

While preparing the site we discussed the importance of balance in our plant communities, as opposed to outright eradication of any undesirable plants. The high participation in the map-making activity was easily matched in the planting stage, as the empowered children were full of questions and suggestions concerning our management of plants with invasive tendencies. The attention to detail and the great care evident in their efforts—from hand pulling weeds to carefully loosening plant roots before planting—was soul-affirming. We continue to celebrate the results of



Preparing the ground for a new Wildflower Patch. Photo by Trinity Pierce

their hard work as the burgeoning wildflower population is thriving.

Moving forward, children will take ownership in respecting and managing our Wildflower Patches. Soon we will break ground on the Grassland Greenhouse project, which will allow children to participate in growing and observing plants from seed to in-ground establishment. This will also allow us to create additional Wildflower Patches at a more sustainable cost.

Basic botany studies — such as the quantity and quality of the wildflowers, and monitoring interactions with pollinators — will help the children explore this native plant community at an exciting, appropriate pace on a variety of scales. Additionally, the children will observe and record information related to our honey bees (our new bee hive is located in the vicinity of our Wildflower Patch).

While we had more than 530 land stewardship volunteers last year, many of these visitors are on-site only two or three times throughout the year. One challenge we encountered was making sure participants received proper training and information about our project goals and expectations. We have learned to communicate clearly that, as resilient as wildflowers are, we must continue to sow seeds and plant plugs in the critical establishment period of the first two to three years. Our students saw the wondrous blooms and cheerfulness of the Patch and thought that little maintenance and care would be necessary going forward. We continue to offer subtle reminders and teaching points to ensure no child leaves thinking that growing wildflowers requires only one afternoon of work! We are strongly committed to maintaining this Wildflower Patch, especially during the next few years of establishment. Thank you to the Montana Native Plant Society for making this program a reality!

Pollination and Wildfire

By Michael Simanonok, PhD student, Department of Ecology,
Montana State University

Wildfire is a natural and necessary part of many ecosystems, particularly here in the Rocky Mountain West. Historically, wildfires burned at “mixed” severities, meaning they resulted in a few low- and high-severity burned patches with mostly moderately burned areas. Today, wildfires burn more severely and are larger in size; this is principally due to fire suppression and climate change.

The more open forest canopy and increased light after wildfires allows for large patches of blooming wildflowers, which are especially important for pollinating insects. My work at Montana State University, with support from the Montana Native Plant Society, is investigating how flowering plants and their pollinating insect partners return following wildfire, specifically comparing the effects of high- and mixed-severity burns, and how those effects might change over time. In particular, I’m interested in plant-pollinator networks.

Plant-pollinator networks show which pollinators visit which plants in an area. The structure of these networks can be assessed to infer ecosystem, pollinator and plant health. For example, one of the key structural metrics I’m investigating is nestedness. Nestedness refers to [the degree that] plant-pollinator networks rely on a core group of generalist pollinators to visit most of the flowers in a given area. Generalist pollinators provide the plant-pollinator network with redundancy, ensuring that all the plant species in that area are pollinated. In this way, generalists make sure that pollinators get their pollen and nectar, and that the plants are fertilized and able to make seeds for a new generation. Because the generalist pollinators visit most of the flowers, they form a stable backbone for the network. This allows specialist pollinators to thrive, as the plants on which they specialize are also pollinated — and therefore propagated — by generalists.

Therefore, the degree of nestedness provides information about a plant-pollinator network’s resiliency. For example, a network with low nestedness (very few generalists) would be more at risk for losing a species in the event of a disturbance like wildfire than one with a high number of generalists. I am interested in how network metrics like nestedness differ with burn severity and the age of a burn; in other words, how soon after a wildfire does the network look like a typical, healthy network and how might that “recovery time” change with burn severity.

Over the last two years we’ve been sampling flowering plants and pollinators to build plant-pollinator networks at four recent wildfire sites in the Absaroka Mountains: Thompson Creek (1991), Wicked Creek (2007), Pine Creek (2012) and Emigrant (2013). At each of these wildfire sites, we sample in both mixed- and high-severity burn areas (burn severity determined by the Monitoring Trends in Burn Severity project). Additionally, we have “unburned” plots that have not burned in at least 75 years. To keep



Images taken from one of our field sites in the Emigrant fire, which burned in August and September of 2013. The left shows May 2014, soon after snowmelt during site selection, and the right shows peak bloom, July 2014. This particular site along Six-mile Creek burned at high severity, and shows clear signs of regrowth and recovery within just a few months of the start of the growing season. Photo by Michael Simanonok

these burns comparable, all sampling sites are within 35 kilometers of each other.

Results are preliminary, as both insect identification and data analysis are still underway; however, our early results provide some optimism for recovering pollination networks. Network-level metrics generally show very little change with time since burn, or between burn severities. Nestedness remains relatively constant and pollinator specialization does not change. Nestedness being consistent through time could indicate that these plant and pollinator communities are continuing with business as usual post-burn, more specifically that the plant-pollinator networks we’re seeing are resilient to wildfire.

However, we do see some changes with the individual pollinator and plant communities. The number of pollinator species present is higher in older burns, and this pattern is the same for both high- and mixed-severity fires, whereas the number of flowering plant species is constant for mixed-severity burns but decreases in older, high-severity burns. Therefore, the early story looks to be that plant-pollinator networks are resilient to wildfire, showing recovery within just a few years post-burn with no significant changes at longer time scales. However, there are some indications from the floral data that could indicate some effects from higher severity fires, which we hope to address as we finish data analysis and continue to study these fires. We continued field work this summer (2016), and the additional year of data should clarify these early trends. A huge thank you to the Montana Native Plant Society for helping to fund this work.



some larger plants — columbine and valerian — we discovered more “belly plants.” These are those smaller, easily-overlooked specimens that are attractive and unique in their own ways. I liked the rusty saxifrage and the heathers, in particular.

Because this is the “Exploding Car Battery” hike, where something unexpected always seems to happen, we did not have time to make it up to Lost Buck Pass. We could see it from the upper lake, but had to get back to town before a camping supply store closed. And wouldn’t you know it, we didn’t make it back in time. The storekeepers had locked their doors, but opened up when they saw the forlorn looks of two of our hikers. So all was well that ended well.

Plant Foray Out of Montana

By Gretchen Rupp, *Valley of Flowers Chapter*

ON A BEAUTIFUL JULY DAY, an intrepid group of plant enthusiasts ventured across the border into Wyoming. Guided by Yellowstone Park Botanist Heidi Anderson, the group began at the Boiling (Gardiner) River in Montana, then worked southward. The trip highlighted wetland plants, with stops near the Obsidian Cliffs and in the Norris Geyser Basin.

An intriguing, soggy excursion took the group into an outstanding large wetland near Norris that hosts healthy populations of three carnivorous plants: two bladderworts (*Utricularia*) and a sundew (*Drosera*). These genera have very different modes of trapping their tiny prey: the first uses a sticky surface to trap prey; the second, a chamber that closes. The specimens we found were all having lunch, although none was blooming.

In addition, cotton grass (*Eriophorum*) tussocks emerging from the wet ground showed striking blooms of two handsome gentians — fringed gentian (*Gentianopsis*) and *Swertia* — and big expanses of elephant’s head (*Pedicularis groenlandica*) were just coming into



Mark Schiltz, MLR western manager, welcomes MNPS members to the Roth Family conservation property. Photo by Cissy Klein.

bloom. To top things off, a snipe was incubating four handsome, impossibly large eggs atop a tussock along the route.

Toward the end of the day, the group took a walk on Mount Washburn, above Dunraven Pass. Although the subalpine flora was very diverse, it was already drying out, so the group’s consensus was for the quiet-seeming but really diverse and vigorous Norris wetland as the highlight of the day.

Small But Important

Submitted by Mark Schiltz, *Montana Land Reliance* and Clare Beelman, *Clark Fork Chapter*

WATER HOWELLIA IS A SPECIES OF CONCERN IN MONTANA, with a range limited to depressional wetlands in the Swan River drainage. A small group from the Montana Native Plant Society had the opportunity July 9 to seek out this small, white flowered species in its watery habitat on some conservation land under easement with the Montana Land Reliance. Their reward was to find two previously undocumented locations for this plant.

According to the Montana Natural Heritage Program, water howellia is a winter annual that germinates in the fall, overwinters and continues growing in the spring when conditions are favorable. Chasmogamous (flowers that open and allow for pollination) flowers bloom at the surface in late July-early August; the submerged cleistogamous (flowers that do not open and are self-pollinated) flowers begin in late June. 🌸



Top: Slimy coating of a bladderwort.
Below: A damselfly visits a patch of sundew.
Photos by Jill Davies.



Howellia aquatilis. Photo by Clare Beelman.

Sticky Plants

By Peter Lesica, Clark Fork Chapter

There are a lot of sticky plants out there, and often when you inspect one there will be little insects trapped in the goo. Insect-trapping plants occur in at least 110 genera in 49 different families. It is estimated that 20 to 30% of all vascular plants have glandular hairs. It's often assumed that these sticky hairs are produced in order to slow down or stop herbivory by plant-eating insects. In the case of carnivorous plants such as sundews (*Drosera* spp.), insects that are trapped by the glandular hairs are digested with the aid of enzymes secreted by the plant's leaves. Such "truly carnivorous" species usually occur in nutrient-poor habitats, such as bogs, or are epiphytic on tropical trees. However, about 20 years ago, George Spommer showed that some of our native grassland species with glandular stems or leaves, such as sticky geranium (*Geranium viscosissimum*) and alumroot (*Heuchera cylindrica*), also are able to digest dead insects caught in their hairs (See *Kelseya* Vol. 8, No. 4). This was found also to be the case with a thistle (*Cirsium*) and a beardtongue (*Penstemon*) in Illinois. However, Spommer did not demonstrate that these "protocarnivorous" species actually incorporate the ingested insects into their tissue or that this ability confers any advantage to these sticky plants. Recently the story has become more complex.

Some plant ecologists, particularly Gustavo Romero from Brazil and Billy Krimmel at the University of California-Davis, have suggested a more complicated way in which glandular trichomes can be advantageous. First of all, while some plants can absorb nutrients from dead insects on their leaves and stems, many other sticky species have no enzymes capable of digesting insects; they are clearly not protocarnivorous.

So, is there a reason to produce sticky hairs other than just trapping bugs that are trying to eat you? Romero, Kimmel and

others think there is. Ian Pearse and colleagues at UC-Davis studied a glandular species of columbine (*Aquilegia*) and found that the sticky hairs gave off a scent that attracted all sorts of small insects that would otherwise not have any reason to visit the plant. These "tourists" become entrapped in the glandular trichomes. Predatory insects come to feed on the hapless tourists and at the same time reduce the number of herbivorous insects that, unlike the tourists, are there to damage the plant. Pearse and Krimmel

found the same pattern for a species of tarweed (*Madia*). It seems that these plants are using their glandular trichomes to provide a meal for predatory insects that help protect them from their enemies.

This bizarre pattern is not just a fortuitous relationship. It turns out that many species of predatory true bugs (Family Miridae) are always found on glandular plants. Furthermore, these predatory plant bugs have special adaptations for their sticky lives. Some of these bugs have long legs that allow them to keep their bodies above the goo. Others have special glands that excrete grease on their bodies, allowing them to glide through the sticky hairs with impunity — "Grease is the word...."

True bugs are not the only insects restricted to sticky plants. Gustavo Romero found that several South American

lynx spiders are always found on plants with glandular hairs. These spiders feed on insects trapped by the plant's glandular hairs and deter herbivorous insects from feeding on their host plant. Their long legs allow them to move among the glandular hairs without being trapped. Who needs a web if you have ready-made fly paper?


Perhaps the most interesting case of this sort of indirect mutualism is that of the flycatcher bush (*Roridula gorgonia*). Darwin thought the plant was carnivorous because it has very sticky glandular hairs; however, it was later found that the plant does not exude any digestive enzymes and is therefore unable



Sticky geranium (*Geranium viscosissimum*). Photo by Peter Lesica.



to digest entrapped insects. More recently, entomologists found that a type of assassin bug (*Pameridea noridulae*) is common on flycatcher bush and is not found anywhere else. This bug waits until the flycatcher bush traps an insect and then consumes it. Shortly after its meal, the assassin bug excretes a liquid rich in nitrogen that is easily absorbed by the flycatcher bush stems and leaves. The flycatcher bush captures insects for the assassin bug to eat, and the bug returns the favor by fertilizing the bush. I'm sure that Darwin would have loved this story.

It's pretty clear that glandular hairs must serve a function if a quarter of all vascular plants have them. Sticky hairs might be directly beneficial to plants by immobilizing or deterring herbivorous insects. Or they might be indirectly advantageous by encouraging the presence of predatory insects that prey on the herbivores. Sticky plants might be directly carnivorous by ingesting the trapped insects, or indirectly carnivorous by having a mutualist digest the prey for them. Just think of all the fun you can have speculating which strategy it is the next time you see a plant with little bugs caught in its glandular hairs. 

FURTHER READING

Ellis, A., and J. Midgley. 1996. A new plant-animal mutualism involving a plant with sticky leaves and a resident hemipteran insect. *Oecologia* 106:478–481.

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Romero, G., J. Souza, and J. Vasconcellos-Neto. 2008. Antiherbivore protection by mutualistic spiders and the role of plant glandular trichomes. *Ecology* 89:3105–3115.



Aptly named Spalding's catchfly (*Silene spaldingii*). Photo by Peter Lesica

WELCOME NEW MEMBERS

*The Montana Native Plant Society
welcomes the following new members:*

Calypso Chapter

Michele Bay and Vaia Errett

Clark Fork Chapter

Pedro Marques, Christine Morris, Stephen Harris
and Martin Skinner

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Jim Hanson and Dean LaTray

Valley of Flowers Chapter

Catherine Gardner, Kate Eisele
and Samantha Severyn

Western At-Large

Tammi Adams

Armchair Botany

Submitted by Rachel Potter, Kelsey Chapter

"The Invention of Nature: Alexander von Humboldt's New World," by Andrea Wulf, is the best book I've read in a long while. I couldn't put it down so I thought I'd spread the word. This review from the online New York Times Sunday Book Review does a much better job of introducing this work than I can. A version also appeared in print on September 27, 2015, on page BR19 of the Sunday Book Review with the headline: Nature's Web. Enjoy!

www.nytimes.com/2015/09/27/books/review/the-invention-of-nature-by-andrea-wulf.html?_r=0

MNPS Chapters and the Areas They Serve

CALYPSO CHAPTER - Beaverhead, Madison, Deer Lodge, and Silver Bow Counties; southwestern Montana

CLARK FORK CHAPTER - Lake, Mineral, Missoula, Powell, and Ravalli Counties

FLATHEAD CHAPTER - Flathead and Lake Counties plus Glacier National Park

KELSEY CHAPTER - Lewis & Clark, Jefferson, and Broadwater Counties

MAKA FLORA CHAPTER - Richland, Roosevelt, McCone, Sheridan, and Daniels Counties

VALLEY OF FLOWERS CHAPTER - Gallatin, Park, and Sweet Grass Counties plus Yellowstone National Park

All MNPS chapters welcome members from areas other than those indicated. Alternatively, you may choose to be a member At-Large. We've listed counties just to give you some idea of what part of the state is served by each chapter. Watch for meeting announcements in your local newspaper. Ten paid members are required for a chapter to be eligible for acceptance in MNPS.

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About Montana Native Plant Society

The Montana Native Plant Society (MNPS) is a 501(c)(3) not-for-profit corporation chartered for the purpose of preserving, conserving, and studying the native plants and plant communities of Montana, and educating the public about the value of our native flora. Contributions to MNPS are tax deductible, and may be designated for a specific project or chapter, for the Small Grants fund, or the general operating fund.

Your yearly membership fee includes a subscription to *Kelsey*, the quarterly newsletter of MNPS. We welcome your articles, field trip reports, book review, or anything that relates to native plants or the Society. Please include a line or two of "bio" information with each article. Drawings should be in black ink or a good quality photocopy. All items should be typed, saved in Microsoft Word or rich text format (rtf), and sent electronically to: carokurtz@gmail.com or mailed to *Kelsey* Editor, 645 Beverly Avenue, Missoula, MT, 59801.

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The deadline for each issue is Fall–September 10; Winter–December 10; Spring–March 10; Field Trip Guide–April 10; Summer–June 10. Please send web items to our webmaster concurrent with these dates.

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