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Kelseya

Newsletter of the Montana Native Plant Society



Kelseya uniflora
ill. by Bonnie Heidel

Lichens under the Lens

By Denise Montgomery, Valley of Flowers Chapter

The Valley of Flowers Chapter was fortunate to have Andrea Pipp, program botanist for the Montana Natural Heritage Program, in Bozeman recently to give a workshop on lichens to a group of Chapter members, botanists and folks from the community who were eager to learn about these intriguing — and often mysterious — little jewels.

We've all noticed lichen; they occur at a variety of elevations and in myriad terrestrial habitat types: plains, montane, forest, alpine, tropical and desert. They increase in number and diversity with increasing elevation. Many species thrive in relatively inhospitable places, where vascular plants dare not: on tombstones, roof shingles, old snags and trees; in nutrient-poor soils, exposed windy outcroppings, encrusted on rocks, above tree-line, and in crusted colonies on bare soils. Lichens even have colonized a permanently-parked Buick on my aunt's property.

Appearing on the earth more than 400 million years ago, there are 15,000-20,000 known species of lichen worldwide — 5,561 known in the continental United States and Canada (North American Checklist, Theodore L. Essinger, 2016). At least 41 lichen species are known in Montana.

Lichens are not uncommon, so why don't they receive the fanfare of the vascular mega-flora? They lack the colorful, Vegas showgirl-like forms of some flowers, and their intriguing interactions with eye-catching butterflies and hummingbirds. But lichens are evolutionary wonders and have their own weird charm.



Some lichen specimens studied at the workshop.
Photo by Beth Madden.

Lichen forms are many and varied: little-green-alien branched forms, leaf-like waves, ridged, wrinkled, or witch's hair-like ropes hanging spookily from tree limbs. They come in colors from drab grays and browns to cool silvery-sage greens, vivid yellow, spectacular orange and even inky black. The dazzling chartreuse wolf lichen *(Letharia vulpina)* is definitely Red Carpet-worthy.

When Andrea brought out her little treasures and passed them around, the lab was filled with the oohs and ahhs usually reserved for a fireworks display, which intensified when the specimens were placed under a microscope to reveal their structures and layers. Andrea guided us through this other-worldly morphology, explaining the various forms of lichen; their different parts and their functions; and their unique, mostly asexual, reproductive systems.

Lichens are symbiotic composites of fungi and algae and/or cyanobacteria. These organisms can be free-living, or occur in association with each other. But when they assemble together in a symbiotic relationship, they form a lichen. Some lichen may include a second species of fungus, and current research is now investigating a yeast as a possible fourth player.

The visible body of a lichen is called the thallus and is made up of three main layers: the cortex, the algal and/or cyanobacterial layer, and the medulla. Since free-living fungi don't photosynthesize, they cannot make their own food and must obtain it as parasites or as decomposers.

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Chapter Events

Calypso Chapter

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

Thursday, April 19, 6:30 p.m. "What All the Buzz About?" Come learn about our native bumblebees and how to save important native pollinators through habitat conservation. We'll also watch the short documentary "A Ghost In The Making," about the first U.S. continental bumblebee placed on the endangered species list. Discussion to follow, along with food and beverages provided by Patagonia. Meet at the Patagonia Outlet,16 S. Idaho St., Dillon. Info: Catherine Cain at 498-6198.

Saturday, April 28, 10:00 a.m.-2:00 p.m. The Calypso Chapter presents the 8th annual "Gardening With Natives Workshop." Join us for this free workshop with such topics as benefits of spiders in gardens, how to recognize plant diseases, and herbicide injuries. Bring a sack lunch and water. Coffee and tea will be provided; gardening books and some native plants will be for sale. Meet at the Divide Grange Hall, Divide. Info: Catherine Cain at 498-6198.

Clark Fork Chapter

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

Thursday, April 12, 7:00 p.m. "Flower Profusion." Before last summer's fires we were having a banner year for wildflowers. In this age of smartphones, people often have their own bumper crop of photos of spring and summer displays. Bring yours on a thumb drive or, if they're still on your phone, call Clare at 728-0189 and bring them, too. Room L09, Gallagher Business Bldg., UM Campus.

Thursday, May 10, 6:30 p.m. Our Spring Potluck will be held at the Pineview Park Pavilion off Rattlesnake Drive, just west of Rattlesnake School. Bring your own plate, utensils and a dish to share. No alcohol please. We can look at the spring flora along Rattlesnake Creek, and we'll be putting label sticks together for the annual native plant sale. For more info and directions, call Peter at 728-8740 or Clare at 728-0189.

Eastern At-Large

Info: Jennifer Lyman at 426-1227, jenclyman@gmail.com

Sunday, April 15, 9 a.m. to noon. "Early Spring Wildflower Walk at the Matador Ranch." Join us for a walk on The Nature Conservancy's Matador Ranch and see the first prairie wildflowers of the year — phlox, milkvetch, rock cress, maybe even a prairie crocus! Meet at 8:30 a.m. at the Matador bunkhouse. We will drive to a few locations from there and go for some short walks. The Ranch is located 35 miles south of Malta on Highway 19, turn east down the driveway at mile marker 119. Info: Kelsey at 654-4566, kelseym88@gmail.com.

Saturday, May 26, 8 a.m. to noon. "Spring Wildlife, Flower and Bird Walk at the Matador Ranch." This is a great opportunity to see grassland wildflowers as well as learn about, hear, and see endemic grassland songbirds. Bring binoculars and a hand lens. If there is interest we can also ID some grasses. Easy to moderate hiking. Meet at the ranch bunkhouse at 8 a.m. See above April 15 event for directions. Info: Kelsey at 654-4566, kelseym88@gmail.com.

Saturday, June 16, 8:15 a.m. "North Fork of Dupuyer Creek." This three-mike hike, co-sponsored with the Montana Wilderness Association, is through prairie and foothill wildflowers, across the Old North Trail and grizzly country. We will be on the Boone & Crockett Club's Theodore Roosevelt Memorial Ranch, and will cross the prairie toward North Fork Canyon and Walling Reef. Dave Shea will help with plant and wildlife identification, and discuss the history and spectacular geology of the area. We expect to see more than 75 species of wildflowers, as well as tipi rings and features of the Old North Trail. Meet at the Choteau Information Center, near the Old Trail Museum. Registration required; sign up at www.wildmontana.org/walks. Info: Dave at 466-2161.

Flathead Chapter

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

Thursday, April 19, 6 p.m. "Native Plant Trivia Night." Grab some friends, eat good food and put on your thinking cap! From 5:00 to 8:00 p.m., each brew sold will benefit MNPS, so bring a designated driver and prepare to help out native plants! Backslope Brewing, 1107 9th St. W (Hwy 2), Columbia Falls. (Note Thursday, not Wednesday.)

Monday-Friday, May 7-11. "Flathead Forestry Expo Plant ID Station." Help share the joy of plant identification and appreciation with 5th graders from the Flathead Valley. Volunteer to spend a few hours guiding students in an activity-based lesson. You will be partnered with an experienced presenter. Info and to sign up: Betty Kuropat at 892-0129, bkuropat@centurytel.net or Chantelle DeLay at 758-5331, cbdelay@fs.fed.us.

Thursdays, all May, 10:00 a.m. "Swan River Nature Trail." Here is an opportunity to join one of the most devoted plant lovers in the valley for a stroll along the "Wild Mile." You may get lucky and spy a species of lady slipper from the *Orchidaceae* family, or a native reptile like last year's boa! For the rest of that story, join Anne for one of these outings. Meet in front of the Bigfork Summer Playhouse. Info: Anne at 886-2242.

Wednesday, May 16, 5:30 p.m. "Birdsong Tree Farm Evening Stroll." Valerie Beebe and her forest near Kila are a delight to visit. Birdsong Tree Farm is adjacent to the Smith Lake Waterfowl Production Area and supports a diversity of native and non-native plants. Valerie diligently implements her land management plan with the help of a conservation easement, Certified Family Forest (tree farm), and lots of hard work. We'll see and hear about changes to the forest community as a result of Valerie's work, and some that has occurred on its own. Bring a picnic supper to enjoy at her outdoor living space and teepee. Meet at the parking lot east of the Social Security and Driver Services offices in Kalispell. Info and directions: Valerie Beebe

at 253-8536, cedartrees4me@montanasky.us or Betty Kuropat at 892-0129, bkuropat@centurytel.net. For more about Birdsong Tree farm, go to www.facebook.com/BirdsongTreeFarm.

Saturday, May 19, 9:00 a.m.-2:00 p.m. "Wolf Creek Conservation Easement Hike." In partnership with the Montana Land Reliance, come explore some unique private land near Bigfork that has been permanently protected with a conservation easement. Maria Mantas will lead the group through the native plant communities associated with this moist cedar/grand fir forest. Bring lunch and all-weather clothes. Meet at the Swan River School, across the street from the Echo Lake Cafe, 1205 Hwy 83. Info: Mark Schiltz at 837-2178, mark@mtlandreliance.org.

Saturday, May 26, 9:00 a.m.-3:00 p.m. "Johnson Terraces." Betty Kuropat leads this annual outing to Johnson Terraces — you never know what we'll find. We could see rich purple larkspurs, magenta shooting stars, golden buckwheats and white death camas. Or we might catch a glimpse of *Suksdorfia*, a lovely, uncommon saxifrage that grows in rock ledge grottos. Meet at the Grouse Mountain Lodge tennis court rest area parking, Whitefish. This outing includes a two-mile round-trip walk and a one-hour drive each way. Bring lunch and water. Info: Betty Kuropat 406.892.0129, bkuropat@centurytel.net.


Suksdorfia

THAYNE TUASON, FLICKR.COM

Thursday, May 30, 5:30 p.m.-8:00 p.m. "Viking Creek Trail and Wetlands Restoration." Meander through an area rich in a variety of wetland plants. The Whitefish Lake Institute acquired management of the area to prevent it from being drained for development. Mike Koopal will tell the wetland's story and talk about the Institute's efforts to protect the water quality of Whitefish Lake. Next, we'll stroll through the adjacent 200-acre property that is protected by a Nature Conservancy conservation easement. It, too, has wonderful plants and an interesting story. Andrew will show us how Forestoration and the Center for Native Plants cleaned up and restored a severely impacted utility corridor. Meet at the Super 1 parking lot in Whitefish, south of McDonald's and close to Hwy. 93. We plan to carpool, as parking is limited at both sites. Info: Andrew Beltz at 471-7752, andrew@forestoration.com.

Thursday, May 31, 5:50 p.m. "Columbia Mountain Evening Wildflower Walk." The Columbia Mountain Trail is a flower-lover's paradise. Join Greta Gansauer of Montana Wilderness Association and Ellen Horowitz of the Montana Native Plant Society for a three-hour evening wildflower walk. We'll travel at an easy pace and make lots of stops to view big, bold blossoms and beautiful, subtle ones alike. Meet at Columbia Mountain Trailhead, Columbia Falls. Sign up required; group size limited to 12. Sign up opens April 16 for MWA members and April 30 for non-members at www.wildmontana.org/walks. Info: Greta at 284.1747, ggansauer@wildmontana.org or Ellen at 752-2909, horowitz@centurytel.net.

Thursday, June 7, 5:30. "Coram Evening Stroll." Join Rachel Potter and other plant lovers to search for blooms on Kim Pinter and Gil Jordan's forested property. This Flathead Land Trust conservation easement is adjacent to the Coram Experimental Forest. Who knows, there just may be a rare plant lurking. If you choose, bring a sack dinner to eat while we chat about what we have seen. Meet at Columbia Heights Park and Ride, junction of Highways 206 and 2, or call Kim for directions. Info: Kim Pinter at 387.5814, sydthewilddog@gmail.com. Please RSVP.

Thursday, June 21, 9:00 a.m.-3:00 p.m. "Celebrate the First Day of Summer." Steve Wirt continues to fascinate listeners with his knowledge of native plant life after a burn. We can see the history of fire in this area written on the face of the landscape as we trek up the North Fork Road toward Polebridge. At three or four stops along the way, we'll have an opportunity to learn how fire has affected the growth of flora over years, and to quiz Steve about the effects of heat on our native species and plant restoration. See above June 7 event for meeting location. Info: Steve at 261-2542, wirtland@yahoo.com.

Tuesday, June 26, 10:00 a.m. "Sprunger-Whitney Nature Trail." This hike exemplifies a flora of contrasts. Specifically, we'll note differences between areas that were cleared in the early 1990s and old-growth forest. We will hope to find blooms of paintbrush, bunchberry, honeysuckle, dogbane and rose. We may also see and hear the buzz of pollinators, such as bees and hummingbirds. Bring a lunch and soak up some natural history. Meet at the trailhead. Anne would like this experience to be relaxing and exploratory, so the exact starting time will depend on weather conditions. Please call if you plan to attend! Follow Highway 83 to approximately seven miles south of Swan Lake; turn right at Point Pleasant Campground. Follow signs to the Springer-Whitney Nature Trail. Info: Anne at 886-2242.

Kelsey Chapter

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

***The Chapter is planning something special for the 2019 MNPS Annual Membership Meeting. For the first time, this will be an international affair! In partnership with the Native Plant Society of Saskatchewan, the meeting will be held next year in the Cypress Hills north of the border sometime in late June or early July. So get your passports ready and watch for details in upcoming issues of* Kelseya.**

Maka Flora Chapter

Info: Libby Knotts at 774-3778, libbyknotts@gmail.com.

Valley of Flowers Chapter

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

Sunday, April 22, 10:00 a.m. "Earth Day Weed Pull." Come help with our annual event at the Kagy roadcut. Meet on Kagy,

Chapter Events, continued

between Sourdough and Highland Blvd., to pull weeds and rejoice in the earth! Bring gloves.

Sunday, April 22, 11:00 a.m. "Native Polllinator Garden Spring Cleaning." Bring your gloves and weed wand and help sweep away the vestiges of winter. Meet at the Pollinator Garden, along Gallagator Trail near the climbing rock and community garden plots, between Mason and Garfield.

Western At-Large

Info: Pat McLeod at 295-4343, pat_mcleod@yahoo.com.

Saturday, July 7, 8:30 a.m. "St. Paul Lake." Join botanist Peter Lesica to explore Kootenai National Forest Trail #646 in the Cabinet Mountain Wilderness. We expect to see crazy white *Polemonium occidentale* (Jacob's ladder) on a trail described as having a "rain forest" feel, with an abundance of moss and large diameter trees. The hike to St. Paul Lake is 3.9 miles, starting at 3,060 feet and climbing to 4,780 feet. We will break into groups, if necessary, to comply with the wilderness rule of eight people per group. The trail head is close to the wilderness boundary with a minimal incline for the first two miles. Most of the elevation gain is in the second half of the hike, along with a challenging, bridge-less crossing of Isabella Creek. Bring water, lunch, appropriate clothing and footwear; bear spray is recommended. RSVP appreciated to estimate group size. Meet at the rest area near Troy, junction of Highways 2 and 56, to carpool. Otherwise, meet at the trailhead at 9:30 a.m. Take Hwy 58 to milepost 8, turn east onto FSR 407 and travel approximately 5.6 miles to FSR 407A, follow for 0.18 miles to the trailhead. Info: Pat McLeod at 295-4343, pat_mcleod@yahoo.com.

"Pioneer Botanists" Nominated for Library Award

"Montana's Pioneer Botanists: Exploring the Mountains and Prairies," published by the Montana Native Plant Society, has been nominated by the international membership of The Council on Botanical and Horticultural Libraries (CBHL) for "outstanding contributions to the literature of horticulture or botany." Winners of the 19th Annual Literature Award will be announced in June at the Council's annual meeting in New York City. We'll keep you posted!

Happily, sales of the book have gone very well and remaining copies are limited. If you haven't read it, please check out a library copy — or ask your library to buy one if it hasn't already. Reviews and more can be found at www.mtnativeplants.org.

MONTANA/MINNESOTA

Congratulations to 2018 Small Grant Winner

By Betty Kuropat, Small Grants Committee Chair

The MNPS Small Grants Committee is pleased to announce this year's award to Julie Etterson, Erin Espeland and Sophia Green for their proposal "Does cultivation of Montana wildflower species on native seed farms cause unintended evolution?"

The researchers are working with Native Ideals Seed Farm in Arlee, MT, to test whether commercially grown *Cleome serrulata* (Rocky Mountain bee plant) is evolving due to selection for "domestication" traits. They will compare traits of plants grown from wild-collected seeds and farm-collected seeds. The wild, or "before cultivation," seeds came from populations that were used to establish seed farm populations. The "after cultivation" seeds were harvested after four generations on the farm.



Cleome serrulata

MATT LAVIN

The researchers consider this greenhouse study a first step toward understanding genetic effects of cultivating native plants. They plan to expand their research to other Montana plant species, and to test wild and cultivated seed under natural conditions. The results of this and similar studies should help identify ways to increase native seed availability without compromising genetic integrity as cultivated plants are re-introduced into native landscapes.

This project is an academic-government-small business collaboration: Julie Etterson, Ph.D., is an ecological geneticist and Sophia Green is a biology student at the University of Minnesota/Duluth; Erin Espeland, Ph.D., is a research ecologist with the USDA Agricultural Research Service in Sidney, MT; and Native Ideals Seed Farm, LLC, is a commercial venture in western Montana. This Small Grant will support travel costs to Montana to discuss study results, collect seed, and plan field experiments for comparisons under natural conditions in Montana.

President's Platform



Our Other Vital Activity

In February, the Montana Native Plant Society again performed one of its most essential functions: the convening of the biennial Montana Plant Conservation Conference. This conference brings together technical experts to discuss and debate key aspects of native-plant conservation.

Most members of MNPS are neither botanists nor plant ecologists, and this event doesn't register prominently on everyone's radar. It is, nonetheless, one of the most important activities MNPS sponsors. According to our mission statement, MNPS exists "...to preserve, conserve, and study Montana's native plants and plant communities." We can't do any of those things if we don't know the status of our plant communities and their component species. We also need a good understanding of current and potential threats to Montana native plants and plant communities, and possibilities for human actions to forestall or mitigate these threats. Hence, the Plant Conservation Conference.

Past conferences have ranged widely over the topic of Montana plants — for example, focusing on the potential for genetic science to elucidate the status of plant species, or the pollinator communities that are vital collaborators with plants. For this, our 10th year, the Conference concentrated on the status of Montana's threatened and endangered plants, and began a discussion on a potential collaborative conservation strategy. MNPS proudly co-sponsored this year's event with the US Forest Service, the Montana Natural Heritage Program, the USDA Natural Resources Conservation Service, and Montana Fish, Wildlife & Parks.



Chantelle DeLay and Scott Mincemoyer lead the workshop deliberating the status of Montana's plant Species of Concern. *Photo by Gretchen Rupp.*

Seventy-five participants first heard presentations and an expert panel on the status of whitebark pine (not a happy outlook). Experts next detailed how threatened water Howellia and Ute ladies-tresses are doing (more hopeful). Participants also heard about examples of fragile plant communities being endangered as a result of ignorance or carelessness, and about one action to protect a special area — the nomination of the Lost Trail National Wildlife Refuge as an Important Plant Area for its large population of Montana's third most-threatened plant, Spaulding's catchfly. What a collaborative Montana plant conservation strategy might look like was the next topic of discussion. The last part of the conference was devoted to a workshop in which Montana's field botanists discussed the current status of plant Species of Concern, as identified in the data maintained by the Montana Natural Heritage Program.

And this brings me to a subject that could involve us non-experts — should we wish to get involved. The MtNHP database contains an astonishing amount of detailed information about dozens of rare plants, all of which is available online. In consultation with experts (and in the field with them, at least to start), we can become plant sleuths, seeking out occurrences of rare plants and bolstering the collective understanding of their ranges and the threats they face. If becoming a citizen-scientist interests you, watch this space! Later this year, *Kelseya* will feature a primer on accessing information about Montana's plant Species of Concern. We can all "preserve, conserve and study" Montana's native plants, to whatever degree we wish.

— Gretchen Rupp

MNPS ELECTIONS Get Ready to Vote!

Once again, MNPS members have the opportunity to vote for statewide Board positions. This year, we need to confirm people for the roles of Vice-President, Secretary and Eastern At-Large Representative.

Please read the candidate profiles and fill out the enclosed ballot, or vote online at www.mtnativeplants.org. Votes will be counted and winners announced at the 2018 Annual MNPS Membership Meeting, June 29-July 1, near Lincoln, MT.

The Sex Lives of Plants: A Primer

By Peter Lesica, Clark Fork Chapter

For many people sex is one of the more interesting things about being alive. Nonetheless, the sex life of mammals is boring compared to that of plants. In our flora most of the species are monoecious, in other words both sexes are on the same plant (monoecious means "one house"). This opens up some possibilities. In most cases monoecious plants have flowers that produce both both eggs and sperm, although some monoecious plants, such as king's crown (Sedum rosea), have "imperfect" flowers in which each flower is either male or female but not both. Sometimes the eggs of one plant can only be fertilized by the sperm of a different plant of the same species (obligate outcrossing; many orchids are like this). However, in our flora it is very common for plants to have a mixed-mating system where they can produce viable seed either through outcrossing or by being self-pollinated. In humans this would be the equivalent of being a lonesome bachelor and still being able to have children. This comes in very handy if you are the only plant of your species on an island. But things can get even stranger. Some species, such as dandelions *(Taraxacum spp.)* and hawthorns *(Crataegus)*, have flowers that produce viable seeds without any fertilization at all, and the progeny are carbon copies of the parents. How's that for scary!





Female (above) and male (right) *Atriplex canescens* from Utah.. *Photos by Peter Lesica*

Not all Montana flowering plants are monoecious. Some are dioecious with each plant having either male or female (imperfect) flowers but not both (dioecious means "two houses"). For example, green ash, a common street tree native to eastern Montana, is either male or female, and horticulturists usually plant male trees because they don't produce a lot of messy winged seeds. Willows and cottonwoods are also dioecious. These plants are like mammals, each individual is either male or female, and it takes two to tango. But not always; dioecious plants have more up their sleeves than you might imagine.

It won't be too surprising to women who have borne children that it's harder to be a female than a male. For example, biologists have found that females of boxelder *(Acer negundo)* grow as well as males until they start producing fruit, after which they grow more slowly than males. Botanists have found that females of many plant species tend to be more prevalent in benign habitats, while males are more common in stressful habitats (believe it or not this is referred to as the "Jack Spratt effect" in the biological literature). For example, biologists have found that male plants of meadow rue *(Thalictrum)*, maple *(Acer)*, spike fescue *(Leucopoa kingii)*, greasewood *(Sarcobatus)* and Utah juniper *(Juniperus osteosperma)* are generally found in drier habitats, while the females tend to occur in moister sites. Male spinach plants were proportionately more common with greater levels of crowding. Species in ten families have all been found to have males more in harsh environments compared to females. This makes sense; females need a more benign environment because they expend more energy producing fruits. But how do these dioecious plants divide up the environment like this? The females can't just pull up their roots and stroll over to a moister site. Perhaps the females have greater mortality in harsh sites, but that doesn't explain why there are fewer males in benign sites. This is where it gets kinky.

Individual plants of many dioecious species

have been observed to regularly change sex and then later change back again. These species are called subdioecious by biologists. These days, if we were talking about people, we would call them transgender. Carl Freeman and his collaborators have studied this phenomenon on several plant species over many years. Much of their research has focused on four-wing saltbush *(Atriplex canescens)*, a species that commonly occurs in sagebrush steppe and badlands in eastern Montana. They showed that the ability to change sexes is an adaptation to a patchy environment. In other words, if you land in a good spot you're likely to develop to be a female but if you land in a stressful habitat you may well have to put up with being a male. But even if you're a female in a good spot, drought or a severely cold winter can cause you to change to being a male. If that isn't strange enough, just bearing a heavy seed crop can cause a change to maleness. Freeman et al. also found that both male and female plants could also become monoecious with both male and female flowers on the same plant, and they found that plants that changed sex lived significantly longer than either strictly male or female plants. Jack-in-the-Pulpit *(Arisaema triphyllum)*, a relative of our skunk cabbage, has a somewhat different strategy. When plants are small, they are strictly vegetative; medium-size plants are males; and large plants are female. As it grows, each plant gets to try its hand at all the options.

So how does this work? Most animals have chromosomes that determine an individual's sex. In humans, if you have two X chromosomes you're female, and one X and one Y chromosome makes you a male. So what's with these transgender plants? More than 50 species, including marijuana *(Cannabis sativa),* white campion *(Silene latifolia)* nettle *(Urtica dioica)*, buffalograss *(Buchloe dactyloides)* and aspen *(Populus tremuloides)*, have been documented to be transgender, and many of these have sex chromosomes. As it turns out, hormones affect sex expression in plants (and to some extent in people, too), and plant hormonal levels are influenced by the environment. In this way environment can affect sex expression. All of this makes sense. Many dioecious plants are flexible enough that they can sense the quality of the environment and use hormones to determine their sex and thus maximize their reproductive output. If things are good, be a female and make fruit. If things are not so good, you'll have to settle for being a male. Looks like gender identity is not uniquely a human issue.

Further reading

Bierzychudek, P. 1982. The demography of Jack- in-the-Pulpit, a forest perennial that changes sex. Ecological Monographs 52: 335-35 1.

Freeman, D. C., E. D. McArthur and K. T. Harper. 1984. The adaptive significance of sexual lability in plants using Atriplex canescens as a principal example. Annals of the Missouri Botanical Garden 71: 265-277.

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Workshop participants examine lichen structure under light microscopes. *Photo by Beth Madden.*

In lichen, fungi make up the larger portion and provide structure and protection for the algae and cyanobacteria. The cortex contains fungal filaments (hyphae) that help anchor the lichen and absorb water and nutrients from a substrate for the algae to use. In turn, the algae supply carbohydrates to the fungus. Both algae and cyanobacteria photosynthesize. Cyanobacteria can also fix nitrogen from the environment, then release unused nitrogen into the soil where it can be taken up and used by other organisms. The medulla contains fungal hyphae and is the site for gas exchange. It also contains chemicals which, in part, may provide protection for the algae and cyanobacteria.

The lichen thallus appears in a number of growth forms. In the workshop, we discussed three forms commonly found in Montana:

Foliose lichens are leaf-like in appearance with distinct upper and lower surfaces. Shield lichen, with flattened silvery gray-green lobed leaf-like bodies, are examples of foliose lichens.

Fruticose lichens are three dimensional forms. They may be stringy like witch's hair *(Alectoria)* or branched like wolf lichen *(Letharia)*. The bright chartruese *Letharia vulpina* is highly toxic and was once used in Europe to poison wolves.

Crustose lichens are those with little dimension that form on surfaces, such as rocks, often in large, colorful colonies, or in crusts on very poor soils. Crustose lichens break up rock, releasing minerals that help to build and condition soils.

At the workshop, we looked at a variety of foliose and fruticose lichens under the microscope, examined their fascinating layers and reproductive structures, and gained an appreciation for the intricacies of these "simple" organisms. Andrea explained the niche lichens have in the environment as indicators of air quality and absorbers of toxins. They also provide food for animals, (i.e. deer, especially in winter); nesting materials (hummingbirds, spiders); and are used by people (clothing, dyes, medicine); and benefit poor soils (providing nitrogen and decomposing substrates to release minerals, improving aeration and building soil).

The more we learn about lichens, and understand their roles in the environment, the more we will appreciate their unique beauty, their importance to the planet's ecosystems and to our lives. Thanks to Andrea for bringing us this fantastic workshop!

Small Grant Reports

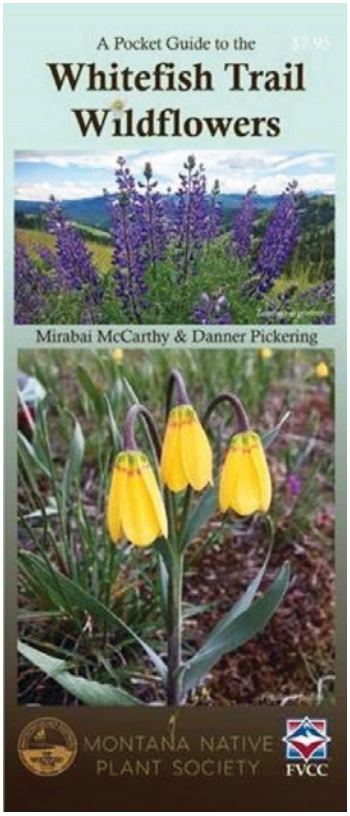
Promoting Botanical Literacy in a Mountain Community

By Mirabai McCarthy, Associate Professor Plant Biology, Flathead Valley Community College

In 2010, the Whitefish Legacy Partners (WLP), a non-profit organization in Whitefish, began building a trail system in northwest Montana known as the Whitefish Trail. The creation of this trail was driven by the community, sponsored by donors, and has been a collaboration of efforts put forth by the WLP, City of Whitefish, Department of Natural Resources and Conservation, U.S. Forest Service, Montana State Parks, and many local private conservation and recreation champions. There are ten trailheads connecting more than 42 miles of trail that encircle the city of Whitefish.

The trail system is multipurpose, offering access for hikers, bikers, equestrians, dog walkers, and many winter activity users as well. The trails meander though a range of public and private lands, including protected forested habitats where wildlife is frequently encountered. In addition to the diverse recreational opportunities afforded by the trail system, numerous educational programs are also offered to the community throughout the year, including guided hikes to observe the flora and fauna, nature photography, school field trips, and diverse summer camp activities. The WLP educational programs serve approximately 500 community members each year, and annual participation continues to increase. All programs are led by volunteers and members of the WLP.

Despite the dynamic educational opportunities and recreational popularity of the Whitefish Trail, a reliable guide to plant identification was unavailable for this highly utilized area. The goal of our project was to conduct a floristics survey of the Whitefish Trail, and create a plant guide to the flowering herbaceous plants and shrubs that grow there. All 42 miles of trail were extensively surveyed by bike and by foot during peak flowering time, between April and October 2016. The trail was visited bi-weekly and each section was surveyed, on average, every other week. Plants were identified on sight, or collected, pressed and identified later using various dichotomous keys. Notes were made regarding; (1) species location along the trail; (2) type of plant: herb, shrub, or aquatic, and; (3) whether species were native, circumboreal, introduced, or weedy. Plants were photographed in the field, and flowering times were documented. Vouchered specimens of plant collections were deposited in the herbarium at Flathead Valley Community College. Approximately 180 species of flowering plants were documented over the course of six months, of which approximately 50% are considered native to Montana. Thousands of pictures were sorted and named, and 125 images were selected for the creation of our guide.



…helping connect our community to important places worth protecting, ensuring that future generations will be able to experience the same beauty that we have the pleasure of seeing today.

A Pocket Guide to the Whitefish Trail Wildflowers is the result of an undergraduate research project through Flathead Valley Community College and was conducted by plant biology student, Danner Pickering, and mentor Dr. Mirabai McCarthy. FVCC provides numerous undergraduate research opportunities in almost all of the STEM (Science, Technology, Engineering, Math) fields and strongly supports this type of learning. For this particular research project, the methodology and procedures needed to create the wildflower guide were more advanced than those encountered in typical botany classes. Pickering learned valuable field and laboratory skills, including plant collecting, identification, and preservation techniques, and was also trained on herbarium maintenance and proper long-term storage of plants for preservation.

Printing of the wildflower guide was made possible by generous donations from the Montana Native Plant Society's Small Grants Program and FVCC's enhancement grant program. Our collaboration with the WLP, and the support of MNPS and FVCC, is helping connect our community to important places worth protecting, ensuring that future generations will be able to



Opportunities for photography abound along the Trail.

experience the same beauty that we have the pleasure of seeing today. We hope this guide will help to engage people in plant identification, promote botanical interest and literacy, and provide a resource that can be used as an outreach tool to promote conservation awareness throughout the community. Together, we can help sustain these environments and keep the flora rich and plentiful. Thank you, MNPS, for your support!

Wild flower guides can be purchased for $7.95 at the FVCC Bookstore, Whitefish Legacy Partners office, City of Whitefish Parks and Recreation, and various retail stores in Whitefish. The guide contains names and color photographs of more than 125 flowering plants found along the Whitefish Trail. Sale proceeds support FVCC study abroad programs and Whitefish Legacy Partners. For more information about the guide or undergraduate research opportunities at FVCC, contact Dr. McCarthy at mmccarthy@fvcc.edu or (406)-756-3624.





Balsamroot (top) and beargrass are two showy native plants of the Whitefish Trail. *Photos by Mirabai McCarthy.*

HOORAY FOR NEW MEMBERS!

The Montana Native Plant Society welcomes the following new members:

Calypso Chapter
Jared Trilling, Roberta Coppinger and the James Doyle family

Clark Fork Chapter
Bryce Christiaens, Thomas Javins, Nicholl Kapp, Dixie Rodriguz, Meghan Ross, Glenda Scott, Jamison Starbuck and Shelly McGuire

Flathead Chapter
Kristina Boyd, Holly Butlett, Tammie Lee, Crystal Walkup, Kate Schlapfer, and lifetime members Becky and Larry Williams

Kelsey Chapter
Laya Dunlap, Rebecca Reynolds, Jennifer Passero, Joanne Hurd, Dawn Reynolds and Erica Scuhler

Maka Flora Chapter
Leah Grunzke and Jacob Powell

Valley of Flowers Chapter
Leslie Eddington, Sarah Howell, Laura Smith, Susan Tallman and Judy Tsiang

Western-At-Large Chapter
James Hatley and Rose Lehman

Eastern-At-Large Chapter
Martin Ellenburg and Nell Delao

Small Grant Reports, continued

Lake County Rainbow Drive Park Restoration Project

By Heidi Fleury, Conservation Coordinator, Lake County Conservation District

The Lake County Rainbow Drive Park Restoration Project was truly a community effort. It involved local landowners and volunteers, Lake County officials, and state natural resources specialists working together to tackle community concerns about capacity for use and resource degradation at a public access site on the Swan River. The project was financially supported by the Montana Native Plant Society as well as the Montana Department of Natural Resources Conservation and Resource Development Division.



River Stewardship Workshop work group stands next to the newly installed cat-eye exclosure.

On Saturday, April 22, 2017, the Lake County Conservation District (LCCD) hosted a River Stewardship Workshop in Swan Valley. This workshop was offered in partnership with the Lake County Commissioners, Lake County Park Board, the Soil and Water Conservation Districts of Montana (SWCDM), Montana Fish, Wildlife and Parks (FWP), the Swan Lakers, Flathead Lakers and the Flathead Conservation District (FCD). The purpose of the River Stewardship Workshop was to offer a landowner education day to address both river bank restoration techniques and river stewardship principles. We budgeted for 30 participants and ended up with 27 in total.

The workshop consisted of a two hour seminar-style session held at the Swan River Community Hall and a two hour planting on-site at Rainbow Drive Park on the Swan River. The seminar portion covered three topics: basic concepts of riparian health by Valerie Kurth from FCD, riparian restoration strategies by Franz Ingelfinger from FWP, and principles of river stewardship by Sam Tappenbeck from SWCDM. The on-site demonstration planting was led by LCCD Outreach and Education Coordinator Kristi D'Agati and Big Sky Watershed Corps member Karli Becher. The planting demonstrated installation of "cat-eye" exclosures, a new method of browse protection conceived by Wildlife Program managers from the Confederated Salish and Kootenai Tribes. The cat-eye exclosures create low-cost, low maintenance, reusable browse protection for restoration plantings. The work group was able to install two exclosures and 50 new riparian plants. Each member of the work group contributed two hours of time totaling 54 hours of volunteer labor. It was a great kick-off to the full-scale restoration planting, fencing installation and river access improvement that was to be completed in October 2017.

The final phase of the Rainbow Drive Park Restoration Project involved Lake County Commissioners, local landowners, and Lake County Park Board members cooperating to address issues surrounding overuse of the river access. Fencing and a gravel walkway were installed to relocate and define the river access point, and large stone stairs were set into the bank to protect it from further erosion. Following completion of this work, LCCD staff, the Montana Conservation Corps and LCCD's Big Sky Watershed Corps member implemented a full-scale restoration planting. This work included adding topsoil; installing 193 native shrubs, trees, and forbs; stabilizing the degraded bank with coconut fiber; and covering all this with a restoration grass and Lake County Pollinator mix. Plants were procured locally from the Confederated Salish and Kootenai Tribal Nursery. The Montana Conservation Corps Northern Rockies Region out of Kalispell donated 28 hours of volunteer labor and tools, and the Lake County Commissioners donated weed- and seed-free soil from Creston Topsoil. This cooperative effort created a more user-friendly river access that protects the river bank from future erosion, restores native riparian vegetation, and benefits pollinators. Thank you again to MNPS for supporting this effort.



A gravel path, improved river access point, bank restoration and fall planting completed the project. *Photos by Heidi Fleury.*

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.

Moving? Please notify us promptly of address changes at mtnativeplantmembership@gmail.com.

Your mailing label tells you the following:

CHAPTER AFFILIATION: CAL=Calypso; CF=Clark Fork; F=Flathead; K=Kelsey; MF= Maka Flora; VOF=Valley of Flowers

AT-LARGE AFFILIATION: EAL=Eastern At-Large; WAL=Western At-Large

YEAR YOUR MEMBERSHIP EXPIRES: Memberships expire Feb. 28 of the year listed on your mailing label.

Use this form or go online to join the Montana Native Plant Society

Membership in the Montana Native Plant Society is on an annual basis from March 1 through the end of February of the following year. New-member applications processed before the end of October each year will expire February 28 the following year; those processed after the end of October will expire February 28 of the year after.

Membership renewal notices are mailed to each member in January. **Please renew your membership before the end of February** so you won't miss out on scheduled events and issues of *Kelseya*. Your continued support is crucial to the conservation of native plants in Montana. ***THANK YOU!***

MONTANA NATIVE PLANT SOCIETY MEMBERSHIP

Name (please print)_____ Phone_____

Address_____ City/State/Zip_____

E-mail_____ Chapter Affiliation (optional) _____

Delivery preference _____ paper by USPS* _____ digital by email

You will receive membership acknowledgment by email, as well as a pdf of the most recent Kelseya. Future newsletter issues will arrive according to your preference indicated above.

** Canadian subscribers asking for paper copy of the newsletter, please add $4.00 to cover mailing costs*
***Additional donations may be specified for a particular project or the general fund*

JOIN OR RENEW ONLINE at www.mtnativeplants.org

or mail application to:
Montana Native Plant Society
P.O. Box 8783
Missoula, MT 59807-8783

Membership Level	Dues with affiliation*	I am paying for _____ years	Donation**	Total amount enclosed
Individual	$20			
Family	$25			
Business/Organization	$40			
Living Lightly	$15			
Lifetime (one-time payment)	$300 per household	----------		

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 communites 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 *Kelseya*, 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. Photos should be sent as high-resolution jpegs. All items should be emailed to: carokurtz@gmail.com or mailed to *Kelseya* Editor, 645 Beverly Avenue, Missoula, MT, 59801.

Advertising space is available in each issue at $5/column inch. Ads must be camera-ready and must meet the guidelines set by the Board of Directors for suitable subject matter; that is, be related in some way to native plants or the interests of MNPS members.

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.

If you want extra copies of *Kelseya* for friends or family, call the Newsletter Editor or email: carokurtz@gmail.com. No part of this publication may be reprinted without the consent of MNPS. Reprint requests should be directed to the Newsletter Editor.

Changes of address and inquiries about membership should be sent to MNPS Membership, P.O. Box 8783, Missoula, MT 59807-8783, or send by email to mtnativeplantmembership@gmail.com.

Visit our website at: www.mtnativeplants.org
or contact our webmaster Bob Person at: thepersons@mcn.net
For Facebook posts, contact Clare Beelman at: clare.beelman@gmail.com

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