

Kelseya

Newsletter of the Montana Native Plant Society



Kelseya uniflora
ill. by Bonnie Heidel

Montana's Arboretum – Part 2

By Beth Judy, Clark Fork Chapter



Siberian larch (*Larix sibirica*)

Photo by Ken Stolz

The 150 acres of the main University of Montana campus = the State of Montana Arboretum (SMA), and scattered across that space grow about 2,300 trees of 119 species. Designated by the Montana legislature in 1991, the SMA has been developing ever since—slowly, just like a tree.

The intention with which arboretums are planted is reflected in specific “collections” of trees and plants. This article, the second of two on the SMA, describes the arboretum’s collections, with some highlights. The SMA is physically divided into eight forest regions of North America. Each one of these, really, is a collection. They are:

Boreal Forest—representing the cold northern reaches of the continent, where spruce, pine, fir, and species of poplar and larch dominate. At the SMA, look for paper-birch (*Betula papyrifera*), a standout species also called canoe birch. A source of wood, medicine, and other products, it is New Hampshire’s state tree.

Northern Rockies—mountain ecosystems shaped by fire, dominated by conifers. At the SMA, western larch; ponderosa,

lodgepole, limber, and whitebark pines; subalpine fir; and Engelmann spruce represent this region. An especially unusual species is a natural hybrid larch from the Bitterroot Mountains, offspring of *Larix occidentalis* and *L. lyallii*, species that usually occur at separate altitudes.

Southern Rockies—Wyoming and south. SMA trees from this region include white fir, Colorado blue spruce, Gambel’s oak, and bristlecone and southwestern white pines. One bristlecone at SMA, in front of the Forestry Building, is probably Montana’s largest. MNPS member John Pierce’s father, UM professor William Pierce, collected the seeds from which it grew. Bristlecones are one of the longest-lived tree species.

Pacific Coast Forests—areas west of the Cascade Mountains, represented at SMA by Alaska yellow cedar, western hemlock, western redcedar, and more. Western redcedar (*Thuja plicata*), the largest tree in the cypress family, lives 400 to 1,000 years. Its rot-resistant, aromatic wood is appreciated in decks, boats, and paneling, and its bark had many uses, including medicinal ones.



Chapter Events

Calypso Chapter

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

Sunday, May 5, 10:00 a.m. Native Garden Care in Downtown Dillon. Help keep the Chapter's native garden weed free and looking nice, starting today and continuing throughout the summer. The garden is located in the median strip on Helena Avenue (left at the first light on Montana St., coming from the north). Bring gloves and a digging tool, and spend a couple of hours weeding out non-native perennials and encouraging the native plantings in their fifth year. Info: Catherine at 498-6198, nativeplants@montana.com.

Saturday, June 29, time TBD. Big Sheep Creek-Nicholia Basin. Join Mike Garverich, retired NRCS geologist/biologist, to explore the basins and benches of southwestern-most Montana, west of Dell. This all-day adventure, across both Forest Service and BLM land, will include a variety of ecological niches that support specific flora. Optional overnight primitive camping and return via Medicine Lodge Creek may be considered in advance by the group. A minimum number of participants will be needed to make this trip a go. Info and to register: Mike at 491-0887.

Clark Fork Chapter

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

Thursday April 11, 7:30 pm. It's time again to refresh your memory and get pumped for summer plant appreciation. Come review some of your favorite wildflowers — and some you don't know, too — as Chapter photographers show their slides of "Montana's High Mountain Wildflowers." Rm L09, Gallagher Business Bldg., UM Campus.

Wednesday, April 24, 5:30 p.m. Waterworks Hill. The plant community here boasts such spring blossoms as the uncommon Missoula phlox (*Phlox kelseyi* var. *missoulensis*), Rocky Mountain douglasia (*Douglasia montana*), as well as treasured bitterroots (*Lewisia rediviva*) and important pollinator plants like buckwheat (*Eriogonum ovalifolium*). Join Clare Beelman for an exploration of the blooms along the trail. Meet at the Waterworks trailhead on Greenough Dr., just north of Vine St. Info: Clare at 728-0189, clare.beelman@gmail.com.



Bitterroot (*Lewisia rediviva*) on Waterworks Hill.

Photo by Eileen Chontos

Wednesday, May 8, 5:30 p.m. Wildflower Walk at Milltown State Park. Join Clare Beelman on this walk through Milltown State Park in East Missoula in celebration of National Wildflower Week. We'll identify and catalog plant species in bloom along the Overlook Trail. This trail begins at the cliff above the confluence of the Clark Fork and Blackfoot rivers, and works its way through mixed ponderosa forest down to the flood plain of the Clark Fork River. Meet at the Overlook parking area on Deer Creek Road, or visit facebook.com/MNPSClarkForkChapter/events for a map and details. Info: Clare at 728-0189, clare.beelman@gmail.com.

Thursday, May 9, 6:30 p.m. Spring Potluck and Plant Label Party. Bring a dish to share and your nimble fingers for preparing the plastic plant labels for our upcoming plant sale. We'll hope to enjoy a warm spring evening at the Pineview Park Pavilion, near Rattlesnake School, and view the spring flora along Rattlesnake Creek. Bring your own plate and utensils. No alcohol please. Info: Peter at 728-8740 or Clare at 728-0189.

Wednesday, May 15, 5:30 p.m. Grasses of Missoula Valley. Grasses are the foundation of many local habitats. Jim Romo will lead this walk along the Waterworks Hill Trail to understand the difference between natives and non-natives, and to learn about their growth, life cycles and role in local plant communities. Meet at the Waterworks trailhead on Greenough Dr., just north of Vine St. Info: Paul Buck at (970) 901-2418, paul7703@gmail.com, or visit facebook.com/MNPSClarkForkChapter/events for a map and details.

Thursday, May 30, 6:30 p.m. Plant Sale Labeling. Nosh on hors d'oeuvres and sweets while preparing this year's plants for sale. Bring your labeling fingers and a savory or sweet dish to share. Meet at Clare's house, 2 September Dr., in Lincoln Hills. Info: Clare at 728-0189, clare.beelman@gmail.com.

Saturday, June 1, 8:00 a.m.-1:00 p.m. Annual MNPS Plant Sale, Clark Fork Farmer's Market. Help with the sale of many Montana native plant species at this one-day event. Come early for the best selection for your garden. Info: Clare Beelman at 728-0189, clare.beelman@gmail.com.

Wednesday, June 12, 5:30 p.m. Montana Native Botanic Garden, University of Montana. Kelly Chadwick leads this tour of UM's native gardens; we'll see what's blooming and the great diversity of plants that can be grown in the Missoula area. This is a great way to identify and learn about our native flora. Refreshments provided. The garden is located west of the University Center, north of Main Hall, surrounding the old botany greenhouse. The closest parking is north or south of the UC, free after 5:00 p.m. Info: Paul Buck at (970) 901-2418, paul7703@gmail.com, or visit facebook.com/MNPSClarkForkChapter/events for a map and details.

Eastern At-Large

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

Saturday, May 11, 1:00-5:00 p.m. Early Spring Wildflower Walk at the Matador Ranch. Take a walking tour of The Nature

Conservancy's Matador Ranch and see the first prairie wildflower blooms of the year — prairie crocus, yellow fritillaries, Townsend's daisy, milkvetches, and more. Meet at the Matador bunkhouse at 12:30 p.m. We'll drive to a few locations from there; hiking is easy to moderately difficult. The ranch is located 35 miles south of Malta on Highway 191; turn east down the driveway at mile marker 119. Info: Kelsey at 654-4566, kelsey.molloy@tnc.org.

Saturday, June 1, 8:00 a.m.-noon. Spring Wildflower and Bird Walk at the Matador Ranch. This is a great opportunity to see a variety of grassland spring wildflowers — penstemons, milkvetches, blanketflower, and others — as well as native grasses. Additionally, we can learn about, hear, and see endemic grassland songbirds. If there is an interest, we can also look at and learn how to ID grasses with vegetative characteristics. Easy to moderate hiking. Binoculars and/or hand lenses helpful. Meet at the ranch bunkhouse at 7:45 a.m. The ranch is located 35 miles south of Malta on Highway 191; turn east down the driveway at mile marker 119. Info: Kelsey at 654-4566, kelsey.molloy@tnc.org.

Saturday, June 15, 8:15 a.m. North Fork Dupuyer Creek. This three-mile hike, led by Dave Shea, 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 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. This hike is co-sponsored by the Montana Wilderness Association; registration required, opens April 29 at www.wildmontana.org/walks. Act early, this hike fills up fast! Info: Dave Shea at 466-2161.

Sunday, July 21, 9:00 a.m. Ear Mountain Natural Area and Yeager Flats Hike. This moderately difficult, five-mile round-trip hike, led by Dave Shea, passes through limber pine savannah, narrow-leaved cottonwood groves, sagebrush, Douglas-fir/Englemann spruce forest, a portion of the 2000 lightening-caused Ear Mountain fire, and ends up in a vast, high-elevation native fescue prairie near the base of Ear Mountain. In these varied habitats grow a great variety of shrubs, grasses, and forbs, including bitterroot and several orchid species. Clark's nutcracker, chickadees and other birds are common, and prairie falcons nest on cliff faces. This is also good mule deer, elk, mountain sheep, and black and grizzly bear country. A short portion of this hike is actually on the Old North Trail, so archeology and history as well as Rocky Mountain Front geology, wildlife, and management issues will be discussed. The hike concludes by dropping through meadows and old-growth forest to a Metis cemetery on the South Fork of the Teton River. Meet at the Choteau Information Center parking lot at the north end of town on Hwy 89. This hike is co-sponsored by the Montana Wilderness Association; registration required, opens April 29 at www.wildmontana.org/walks. Act early, this hike fills up fast! Info: Dave Shea at 466-2161.

Flathead Chapter

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

Wednesday, April 17, 7:00 p.m. Utah Red Rock Desert Wildflowers. Montana botanist and conservationist Peter Lesica will take us on a virtual tour of his explorations of Colorado Plateau country with all of its eye-popping wildflowers, which are compiled in his most recent book on the same subject. Note change of venue: United Way Meeting Room, Gateway West Mall, Kalispell. Entrance on west side of building, north end. Info: Jen Hintz, jhintz2004@yahoo.com.

Thursdays in May, 10:00 a.m. Swan River Nature Trail. Join Anne Morley for a gentle, two-hour spring birding and wildflower identification stroll. We wander two miles along the Old Swan River Road. Meet in front of Showthyme Restaurant in Bigfork. Info: Anne at 886-2242.

Tuesday, May 21, 6:00 p.m. Columbia Mountain Wildflowers. The Columbia Mountain Trail is a flower-lover's paradise. Join Grete Gansauer and Ellen Horowitz for a three-hour evening wildflower walk that travels through many habitat types — from moist, damp sites to dry, open slopes — where we're sure to find balsamroot in bloom. We'll travel at an easy pace and make lots of stops to view big, bold blossoms and beautiful, unobtrusive ones. Hiking is moderately difficult (about three miles with less than 500 feet elevation gain). Meet at the Columbia Mountain trailhead. This walk is co-sponsored by the Montana Wilderness Association; registration required, opens April 29 at www.wildmontana.org/walks. Act early, this hike fills up fast!

Wednesday, June 5, 6:00 p.m. Whitefish Trail Wildflower Walk. Meander through the woods and learn about the wide array of colorful wildflowers that line the Whitefish Trail with Whitefish Legacy Partners and Diane Lundgren of the Montana Native Plant Society. Identify local flowers and noxious weeds using hand lenses and field guides that will be provided during this two to three-mile hike. This event is free and suitable for all ages and abilities. Meet at the Lion Mountain trailhead. Info: visit www.whitefishlegacy.org; or call 862-3880, margosia@whitefishlegacy.org.

Tuesdays, June 18-August 27, 9:00 a.m. Volunteer at the Glacier National Park Nursery. Help with seeding, transplanting, weeding, and cleaning, or work on a research or experimental project. Bring a sack lunch, your favorite work gloves, and clothes that can get dirty. Drop in and work an hour or stay the entire day. Meet at the GNP Native Plant Nursery. Info: GNP Nursery at 888-7835.

Saturday June 15, 9:00 a.m. Buffalo Lakes Naturalist Hike. Join leaders Lou Bruno and Rachel Potter on a leisurely hike through the beautiful foothill country of the Badger-Two Medicine area. Our destination is the top of Lubec Ridge, where we'll have stunning views of the northern Badger, southern Glacier National Park, and vast prairie grasslands to the east. Along the way, we will stop at Buffalo Lakes, a rich complex of large beaver ponds and wetlands. We'll also make frequent stops to identify wildflowers and songbirds. The hike is moderately difficult, four to five miles



with less than 500 feet elevation gain. Co-sponsored with the Montana Wilderness Association and the Glacier Two-Medicine Alliance. Meet at the Two Medicine Grille in East Glacier. Registration required; opens April 29 at www.wildmontana.org/walks. Act early, this hike fills up fast! Info: Lou at 868-2720.

Sunday June 23, 11:30 a.m. Lichen, Mosses, and Fungi of the Flathead: Medicinal Properties and Identification. Discover the small wonders of northwest Montana forests with student researchers from the Flathead Valley Community College Antibiotic Potential of Flathead Fungi and Flora research project. Before hearing about their unique findings, Skye Hatfield and Raser Powell will teach us about lichens, mosses, and fungi that inhabit the southern Whitefish Range; introduce us to some new and rare species that have been discovered; and describe the medicinal properties of these diminutive creatures. This will be a family- and wheelchair-friendly, short hike with several stops; we'll be back at the trailhead within three hours. Meet at Swift Creek Trailhead. Sponsored by Montana Wilderness Association; registration required, opens April 29 at www.wildmontana.org/walks. Act early, this trip will fill up fast!



Wolf lichen (*Letharia vulpina*) on an old pine overlooking the Swan Valley.

Photo: Forest Service Northern Region

Thursday July 18, 10:00 a.m. Glacier National Park Weed Blitz. Join fellow citizens in removing invasive plants from priority sites in Glacier National Park. Park biologist Dawn LaFleur will train participants on identification and effective hand-pulling techniques for targeted weed species. The morning will be in the classroom; afternoon in the field. Lunch is provided. Meet at the West Glacier Community Building; we'll expect to finish around 4:00 p.m. Space is limited. Info and to sign up: Dawn, dawn_lafleur@nps.gov.

Kelsey Chapter

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

Friday-Sunday, June 21-23. Montana Native Plant Society Annual Membership Meeting. The Kelsey Chapter is hosting this year's meeting in the Cypress Hills of southern Saskatchewan. Members and non-members are welcome. For details about the meeting and tips on traveling to Canada, see insert in this issue or at www.mtnativeplants.org. Info: Karen Porter at 494-0606; karenwporter44@gmail.com.

Maka Flora Chapter

Info: Dave Branson at 489-0463, dhbranson@gmail.com.

Valley of Flowers Chapter

Info: Beth Madden, 224-1012, bethmadden64@gmail.com.

Tuesday, April 9, 7:00 p.m. Landscaping with Native Plants. Beth MacFawn and Denise Montgomery will team up to inform us on how to enhance our yards with native plants. Room 108, Plant Bioscience Bldg., MSU campus, Bozeman.

Saturday, April 20, 10:00 a.m. Earth Day Project. Kagy Boulevard Knapweed Pull. Help pull spotted knapweed and observe the restoration of native plants along the Kagy roadcut. Bring gloves. Meet along the south side of Kagy Blvd. between Sourdough and Highland Blvd., Bozeman. We will be joining other groups for an afternoon Earth Day festival at the Bozeman Public Library at 1:00 p.m.

Western At-Large

Info: Pat McLeod at (575) 687-3335, pat_mcleod@yahoo.com.

Saturday, June 1, 9:00 a.m. Big Eddy Trail #999 (Star Peak). This trail is located above the Clark Fork River on the south end of the West Cabinets, near the Montana-Idaho border. Recently the Cabinet Ranger District and Friends of the Scotchmans reconstructed trail tread along a historic trail location that switchbacks through an extensive system of balds and rock outcrops. The balds start a short distance above the highway and continue up about 1,500 feet on the south facing slope of Star Peak. This is the area we will explore as there should be a variety of flowers blooming about this time. Above the balds, the trail continues up through forest to Star Peak Lookout at 6,167 feet. The lookout will not be our objective as it likely will have quite a bit of snow in early June. This trail is located near Heron, MT on Hwy 200, near Milepost 6. The trailhead is several miles west of the junction with Bull River Road (Hwy 56) and is 0.4 miles west of the Big Eddy Campground entrance. Park on the south side of the highway along a wide turnout. We will walk a short distance up Forest Service Rd. #2292 to the trailhead. Info: Eric Dickinson at 295-1813, ericdickinson99@gmail.com.

Saturday, June 15, 9:30 a.m. Bitterroot Knob Hike. Join us on a hike to visit Montana's state flower! The site is about 1,600 feet above the Kootenai River, between Libby and Kootenai Falls. We'll carpool to a parking spot about an hour from Libby and hike off-trail about a half mile down the gentle ridge. The bitterroots are spread along the crest of the ridge in an open, shallow-soiled area. Bring binoculars; the views up and down the Kootenai River and into the Cabinet Mountain Wilderness Area are fantastic. If the timing is right, we'll see eagles and hawks soaring below us as they search for prey. Meet at the Riverfront Park in Libby, on City Service Road, off the Hwy 37 bridge. Bring plenty of water and sun protection along with your lunch. Note: the date of the outing is subject to change based on seasonal conditions. Info: Jon Reny at 334-0459, jreny@kvis.net.

MNPS News

2019 Small Grants 3 Diverse Projects Picked

By Betty Kuropat, Small Grants Committee Chair

The Small Grants Committee and MNPS Board of Directors were pleased with the variety and quality of the 12 proposals received this year. They included six research projects, three educational gardens, two restoration projects, and a symposium. As always, the Committee worked hard to read, rate, discuss, and agree upon which proposals to recommend to the Board of Directors.

The Committee currently has seven members who rate each proposal based on specific guidelines and criteria. The rating and ranking process is designed to determine how well each proposal achieves these MNPS objectives: "To stimulate research, conservation, and educational activities that help foster an appreciation of Montana's native plants and plant communities, and to promote native plant conservation through a better understanding of Montana's native flora and vegetation and the factors affecting their survival." The Board approved the Committee's recommendations according to previously budgeted funding.

We are excited to award three grants for 2019! We look forward to reading about their stories and results in *Kelsey* next year. The following summaries are condensed from their proposals.

Outdoor Education Center and Demonstration Garden

Flathead Conservation District, Kalispell

This ambitious native-plant garden project will transform a three-quarter acre, weedy lot into a learning center of habitat-themed gardens with educational exhibits. Garden construction will be filmed to produce "how to" videos that can be used for outreach. The garden is designed to address a growing need to educate the local community on the benefits and importance of native plants and will focus on teaching conservation practices. The objectives are to 1) create and maintain a garden to showcase native species; 2) provide education opportunities through an outdoor learning center; and 3) foster beneficial, working relationships with landowners, businesses, and community organizations.

Hailey Graf, FCD assistant conservationist, will manage development and maintenance of the garden. Success will depend on strong collaboration among FCD staff and Board of Supervisors, professional landscape companies, NRCS staff, Montana Conservation Corps, and local college and Vocational-Agriculture high-school students.

MNPS funds will be used to purchase the native plants.

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President's Platform

We're fond of them and fascinated by them, but how important are plants, actually, in the grand scheme of things?

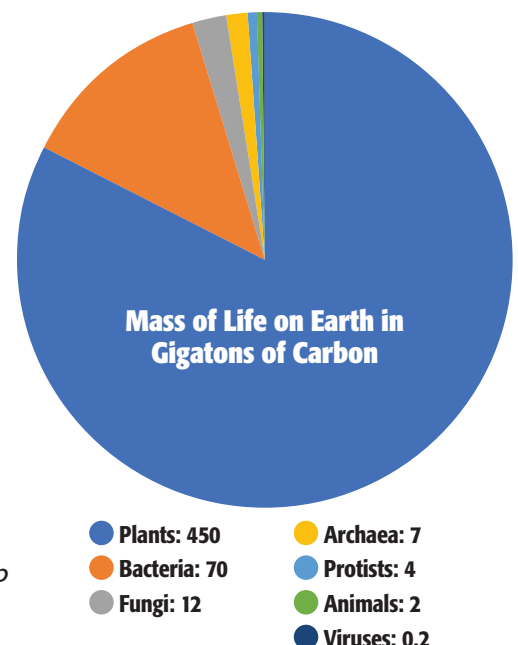
We read that microorganisms are thousands of times more numerous than higher organisms, that there are enormous numbers of insect species, that the oceans have so much more volume than terrestrial environments they must contain far more life — what's the real story? Needless to say, this is very difficult to establish, but a scientific census of the kingdoms of life on Earth has recently shed light on these questions. Biologists from Cal Tech and the Weizmann Institute of Science in Israel took advantage of major technological and scientific advances to make detailed estimates of the masses of living organisms of different kinds, in both marine and terrestrial environments, based on their carbon content. At the highest level, their findings are shown in the accompanying figure. Plants dominate life on Earth, followed far behind by bacteria then all the other major groups of living things.

Several interesting findings aren't shown by the figure. For example, some individual species are fantastically numerous. There's one species of Antarctic marine krill (a small mid-water crustacean) that's collectively more massive than all the birds on and above the Earth. The mass of humans is now far greater than that of all wild mammals. The mass of life in the oceans is much, much less than that on land. There are vigorous communities of microorganisms beneath the soil root zone and beneath the seafloor, but we have only a very approximate idea of their nature and amounts.

The plant picture is fascinating. Plants make up about four-fifths of the mass of all living things, and about 30 percent of this mass is roots. Marine green algae and sea grass comprise only a tiny proportion of the Kingdom Plantae; by mass, it's almost entirely land-based. And yet the photosynthetic activity that takes place in the oceans is roughly equal to that on land, thanks to some marine bacteria and to "protists" like diatoms. Globally, there's far more plant mass in managed and unmanaged forests than in grasslands and croplands. And mycorrhizal fungi — those microorganisms intimately associated with the roots of higher plants that help them take up nutrients — make up a significant proportion of all the fungi on Earth.

All in all, it looks like the partiality of MNPS members toward the plant kingdom is very well-placed. I look forward to seeing you on a field trip in a couple of months — out appreciating plants!

— Gretchen Rupp





Head for the Cypress Hills! Annual Membership Meeting 2019

Get ready Montanans! Check your passports and plan your vacations because we are heading north to visit our Canadian neighbors in the Cypress Hills of Saskatchewan for the 2019 Annual Membership Meeting, hosted by the Kelsey Chapter **June 21-23**. Our theme this year is "Lodgepoles Under Living Skies." Please visit www.mtnativeplants.org for the most up-to-date information about the event.

We have secured Camp Shagabec, a church camp in the beautiful Cypress Hills InterProvincial Park Centre Block in southwestern Saskatchewan, for a joint meeting of the Native Plant Society of Saskatchewan and the Montana Native Plant Society. We also are inviting members of the Alberta Native Plant Council to join us. The Cypress Hills InterProvincial Park Centre Block is only 100 miles north of Havre.

Check out the meeting information inserted in this issue of Kelsey to see what's being offered. **We encourage you to complete your registration on-line via the MNPS website. This year, you should sign up for the field trips and workshops ahead of time.** Please use the detailed description of the Field Trips and Workshops in the insert or on the website to help you select field trip choices on the Registration Form. **Camp Shagabec can only accommodate 120 people, so get your reservations in early.**

You will notice that several field trips are being repeated on Friday and Sunday so that you'll have multiple chances to see as much of the Cypress Hills area as possible. However, this means you may need to arrive the night before to participate in Friday outings. **We have reserved Camp Shagabec for Friday and Saturday nights only**, so if you are arriving early or staying on extra days you should reserve a campsite in the Park as soon as possible. Camping sites for additional nights or RVs sites in the InterProvincial Park fill up months ahead of time. Registration for Cypress Hills camp sites opens April 16 — so don't delay! If you are coming early or staying on after the meeting, we recommend you try to sign up for camp and RV sites in the Centre Block Rainbow Campground, in spots 50-60, which are closest to Camp Shagabec.

To entice families to attend, we are planning many activities for children at the Annual Meeting. **There's no registration charge for children and children's meals are half-price.** Food at the meeting will be catered by The Shop Deli and Bakery in Maple Creek, SK. A detailed menu is linked on the website; please review it to see the great meals in store for you.

And finally, the Kelsey Chapter is preparing materials to help you plan an extended vacation around the Cypress Hills area. Check out the MNPS website under Annual Meetings for information on Other Potential Trip Destinations to visit while in SK or Alberta.

This will be our first truly international meeting and will certainly result in a future joint meeting in Montana with our Saskatchewan and Alberta neighbors. Info: 2019 Annual Meeting Co-Chair Patrick Plantenberg at (406) 431-4615, m2andp2@mt.net.



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Plant Diversity in Bedrock Meadows of Northwestern Montana

Viktoria Wagner, a plant ecologist at the University of Alberta, and her students aim to explore the plant diversity and species composition of natural meadows that occur interspersed among forests in the mid-elevation zone of the Interior Pacific Northwest. This not-well-studied habitat occurs on shallow and periodically seepy soils over dense bedrock in mountain ranges from northwestern Montana to northeastern Washington. Apart from local people and botanists, few others know that these natural "bedrock" meadows are interspersed among mid-elevation forests of the Pacific Northwest. They are found on glacially scoured mountain shoulders, most commonly over argillite.

Preliminary surveys in the Salish and Cabinet Mountains in 2018 showed a rich diversity of annual and perennial native plants, including some "species of concern," and few invasive non-natives. In 2019, detailed field surveys will be completed on sites that were visited in 2018, as well as on new sites on the Flathead and Kootenai National Forests. Voucher specimens will be deposited at the University of Montana Herbarium (MONTU). The Montana surveys are part of a larger effort to inventory, map, and understand bedrock meadows in Montana, Idaho, and British Columbia.

MNPS funds will cover travel expenses for surveys in Montana.

Yaak Valley Weed Control, Huckleberry Monitoring

The Yaak Valley Forest Council Headwaters Program partners with the Kootenai National Forest in long-term efforts to promote revegetation of native plants through weed abatement and planting with native grasses at specific sites in the Yaak watershed. Three river access sites and five miles of decommissioned road turned into a trail — about 25 acres total — will be treated in 2019 with hand pulling, non-toxic herbicide, inspection of weed mats that were installed in 2018, seeding native grasses, and monitoring.

YVFC also partners with the USFS on long-term huckleberry shrub monitoring to promote huckleberry restoration after timber harvest. This is part of their Terrestrial Habitat Restoration Initiative for Vegetative Enhancement (THRIVE). Plots will be re-surveyed every five years to assess shrub abundance on a 160-acre post-harvest burn in the Buckhorn project. Baseline control and treatment plots were installed before timber harvest and burning in 2018.

MNPS funds will pay for mileage, non-toxic herbicide, field supplies, and native plant seeds to distribute at YVFC events.



Elegant Mariposa lily
(*Calochortus elegans*) can be
found in bedrock meadows.

Photo by Walter Siegmund, wikipedia.org



Botanical Illustration with Jane Fournier

Story and photos by Denise Montgomery, Valley of Flowers Chapter

Botanical artist and illustrator Jane Fournier

led a fun and relaxed drawing workshop in March, hosted by the Valley of Flowers Chapter. More than 25 people with varying experience in botanical, or any, drawing participated in the Bozeman event. She will be offering a similar class at this year's Annual Meeting in the Cypress Hills, Saskatchewan.

Fournier, a native of New Zealand and Kelsey Chapter member, started with a warm-up of "blind-contour" drawing in graphite pencil, an exercise that requires careful observation of subject matter and drawing what is seen without looking at the sketch paper, never lifting the pencil off of the page. This prevents an artist from drawing a pre-conceived idea of what he or she imagines a tulip, for instance, should look like. This is an important concept, as accurate representation is the core of botanical illustration.

Before the advent and advancement of photography, botanical illustration was used to scientifically illustrate the forms, colors, and details of plants, often accompanied by descriptive text, to help physicians, pharmacists, and herbalists identify medicinal plants, Jane explained. Today, botanical illustration has evolved into an art unto itself. Historically, watercolor has been the medium of choice, but some modern botanical artists have relaxed the rules a bit with innovations in high-quality oil-based and wax-based colored pencils. Graphite, though, is prized for its ability to render a variety of textures and endless range of values in simple black and white.

Following the contour exercise, we next drew a "skeleton" — simple outlines that focused on shape, then the mid-rib (central vein) of leaves and flowers, before moving on to shading. Paying careful to the lightest lights and darkest darks, we used value and gradation to give form and dimension to our subjects.

Some of us found botanical drawing to be rather "meditative." Certainly while drawing we learned to slow down and really see and understand our subjects. Whether you want to draw an accurate scientific representation for reference or publication, create a nature journal, or depict your favorite native flora, botanical illustration is a great way to understand and appreciate the intricacies and beauty of plants.



Workshop students hone their observation skills (above). Rocky Mountain Columbine (*Aquilegia coerulea*), colored pencil drawing by Denise Montgomery.

Seeking Nominations for Outstanding Individuals in Native Plant Conservation

From time to time, the Montana Native Plant Society likes to recognize individuals who have demonstrated a high level of service, leadership, or achievement in native plant conservation. The MNPS Board seeks your help in identifying potential awardees.

The Outstanding Service Award recognizes an MNPS member who has contributed specific meaningful service to the society. The Special Achievement Award is granted to an individual — member or not — whose work has contributed in a significant way to the mission and goals of MNPS.

Please take a moment to think of and nominate someone you feel has made a difference to the preservation, conservation, study, and/or appreciation of native plants. Any member can make a nomination with a written statement about the nominee's contribution to MNPS (Outstanding Service) or to the Society's general goals and mission (Special Achievement). Please specify which award you have in mind and send your nomination to Maria Mantas (mariamantas@centurylink.net) by May 1. This year's awards will be presented during the Annual Membership Meeting, June 21-23 at Cypress Hills Provincial Park in southwestern Saskatchewan, Canada.



Not All Paintbrush Hosts are Created Equal

By Peter Lesica, Clark Fork Chapter

Most plant aficionados love Indian paintbrush (*Castilleja*). The colorful inflorescences are always a joy to behold. However, Indian paintbrush plants have a dark side; they are hemiparasites. They have photosynthetic leaves that produce carbohydrates, but their roots connect to the roots of neighboring plants and steal water and nutrients from these hosts. Even in a dry year, Indian paintbrush plants look perky when other plants are wilting because they are taking water from their neighbors. Paintbrushes are able to parasitize a large number of different plant species; they attach their roots to whichever host happens to be nearby. Sounds like these hemiparasites have it made on the backs of other plants. But are some host plants better than others for the well-being of the Indian paintbrushes?

Just like most plants, Indian paintbrushes have to deal with insect herbivores. The fact that Indian paintbrush plants remain plump and well-watered even during drought makes them a prime target for plant-eating or -sucking insects, such as aphids and caterpillars. Could the identity of the host plant determine how the paintbrush plant is affected by its herbivore pests?

This is the question that several researchers have explored. More than 20 years ago Michelle Marvier at the University of California Santa Cruz found that if the host plant contained terpenoids, the aphid herbivores of coast Indian paintbrush (*Castilleja affinis*) died at a higher rate than those feeding on the same paintbrush species with different host plants, even if the host contained other poisonous alkaloids. However, researchers at U.C. Davis created low- and high-alkaloid strains of lupine (*Lupinus albus*) and used them as host plants for entireleaf Indian paintbrush (*Castilleja indivisa*). Paintbrush plants parasitizing high-alkaloid lupine had less damage from butterfly and moth larvae and produced more seeds



Yellow rattle (*Rhinanthus minor*), above, and a Montana paintbrush (*Castilleja*) below.
Photos by Peter Lesica



than those whose hosts had low alkaloid levels. These results indicate that which type of host a paintbrush is attached to will affect how well it will be able to tolerate herbivory. Furthermore, which host plant is best for a paintbrush will depend on which herbivore is creating the most havoc, which will, in turn, depend on the weather, the array of predators feeding on the herbivores, and a host of other variables.

For an Indian paintbrush plant, it seems that attaching to the best host is a crapshoot. However, a recent study in England may hold the answer for the

paintbrush's herbivore conundrum. These researchers tested nine different host species for their effects on aphid herbivory of yellow rattle (*Rhinanthus minor*), a close relative of Indian paintbrush. Not surprisingly they found that different host plants more or less reduce or promote herbivore damage. The big news is that hemiparasites always avoided serious aphid damage when they parasitized *mixtures* of host plants which diluted the negative effects of particular host species. In other words, if you're a hemiparasite you're better off in a diverse plant community.

This story has a strange twist in the few remaining native prairies of western Washington. This is where the federally-listed golden Indian paintbrush (*Castilleja levisecta*) occurs. It is also where the federally-listed Taylor's checkerspot butterfly resides, and its caterpillars feed on golden Indian paintbrush. Talk about a messy deal — one threatened species feeding on another threatened species. Researchers at the University of Washington found that the identity of the host plant strongly influenced the nutritional quality of the paintbrush. The changes in paintbrush size and leaf nitrogen, in turn, influenced survival and mass of the checkerspot larvae as they fed on the paintbrush. Caterpillars feeding on larger plants with higher leaf nitrogen gained more mass, and then were subsequently more likely to survive to pupate into butterflies. In this case, paintbrush plants parasitizing yarrow (*Achillea millefolium*) grew larger and had more leaf nitrogen than when connected to tufted hairgrass (*Deschampsia cespitosa*) or narrowleaf plantain (*Plantago lanceolata*). As a result the yarrow parasites produce more checkerspot butterflies. That's good for the butterflies but no so good for the paintbrush. So, whose side should we be on? I suggest that, as the English study suggested, we maintain a diverse community and let the posies and bugs work it out.

FURTHER READING

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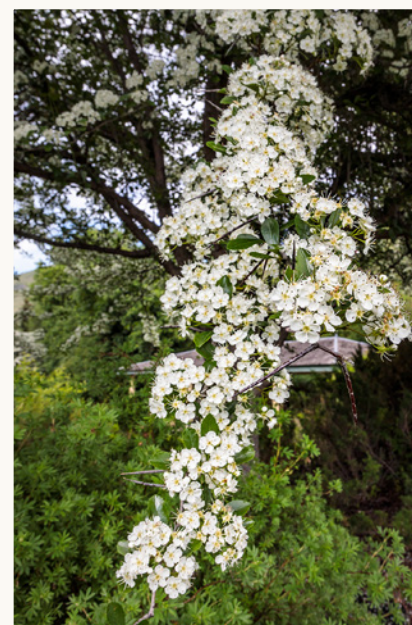


Eastern redbud (*Cercis canadensis*)

Photos by Ken Stolz

Great Plains—from the Western Midwest into the plains, at SMA represented by green ash, boxelder, and other species. Bur oak (*Quercus macrocarpa*), the farthest-north-occurring oak species, is Montana's only native oak. One stand grows in Montana's southeast corner near the tiny crossroads of Alzada—the species's westernmost reach.

Central Hardwoods—Midwest into southern New England, represented at SMA by red maple, white and red oaks, linden, and shagbark hickory. Red oak ranges from Quebec to Georgia, west to Mississippi and Oklahoma. A northern red oak at SMA is probably Montana's largest. The bark of shagbark hickory peels off in long plates as it grows, hence the name. Its nuts provide food; its wood is extremely hard; its woodsmoke, fragrant.



Cockspur hawthorn (*Crataegus crus-galli*)

Northeastern Mixed Woods—Cool mountain reaches (and the SMA) host sugar maple, beech, and eastern white pine. Sugar maple, found in the Great Lakes and Mid-Atlantic states, New England, and eastern Canada, produces both syrup and timber.

Southeastern Mixed Forest—not including southeastern coastal plains. SMA trees from this region include tulip poplar, baldcypress, smoke tree, chestnut oak, yellowwood, northern catalpa, and black gum. Trees from this region are especially interesting, growing in Montana. Yellowwood is rare, even in the eastern U.S. Baldcypress generally likes wet soil, but is a great urban tree because it tolerates other drainage conditions.

OTHER SMA COLLECTIONS INCLUDE:

Larch (*Larix*) species: Only ten to 12 species of larch exist in the world. The SMA has five of them, ranging from Siberian to Japanese to Western to natural hybrids.

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North American Paleo Trail: Species that, the fossil record shows, inhabited North America before the Ice Age. Included are *Ginkgo* (again, the state's largest), *katsura*, *Metasequoia* (dawn redwood), *Zelkova*, *Pseudolarix*, species of magnolia, oak, maple, pine, and more.

The Montana Walk: Emphasizes and celebrates Montana native trees and plants.

Centennial Planting: In 1993, a tree or shrub representing each of the 56 Montana counties and seven Indian reservations was planted. However, this collection needs updating.

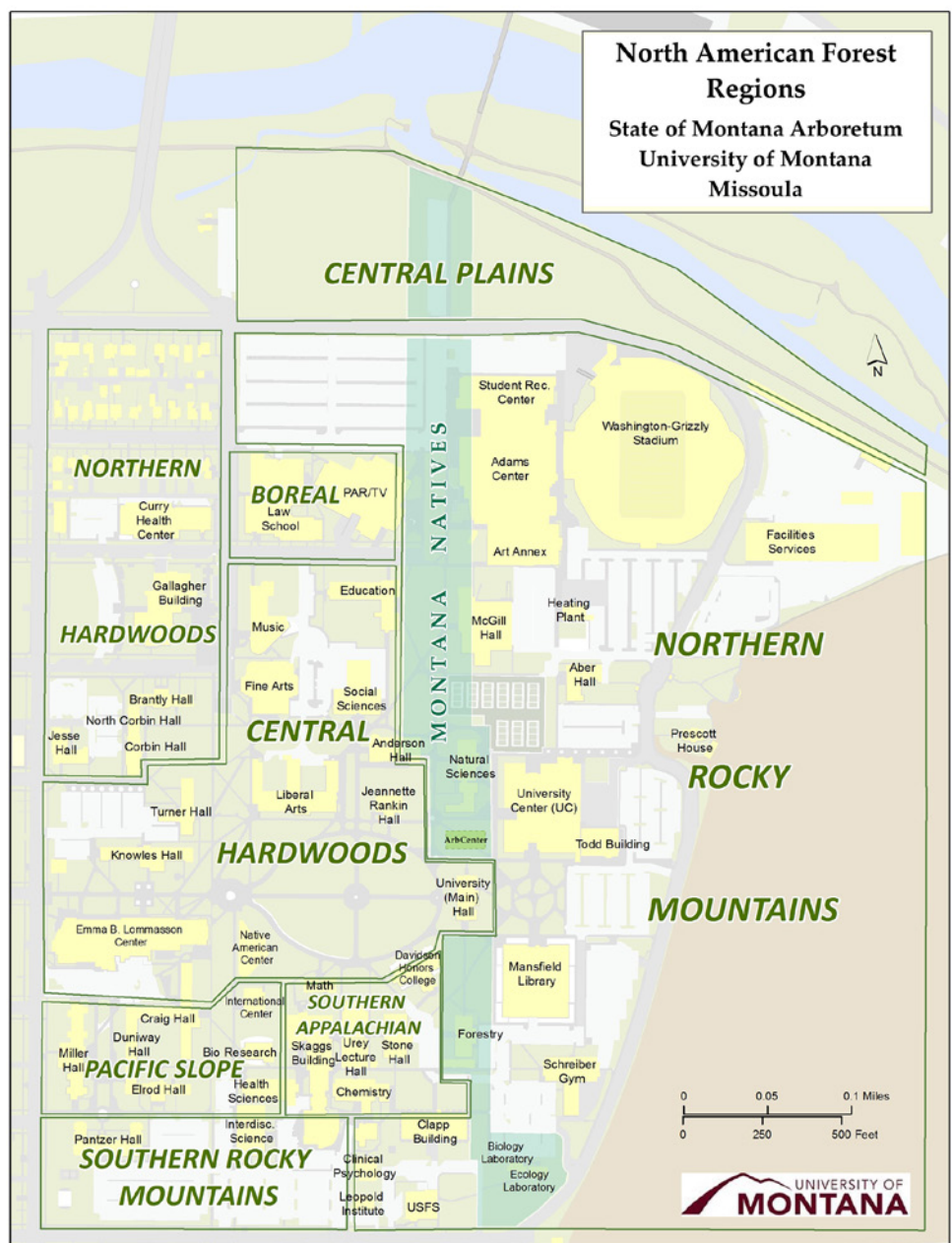
Mini-habitats: In the planning stages so far, these areas will emphasize dominant tree species plus the plants that usually grow alongside them in the wild.

Trees Associated with History:

"Memorial Row," an allee of ponderosa pines planted in 1919, honors 32 UM war dead. "The Hanging Tree," a cottonwood, is named for a short story (also made into a film) by Montana writer and UM journalism professor Dorothy Johnson. A small grove of lindens honors beloved radio personality Kim Williams. A double ring of sugar maples and red and bur oak emulates the historic planting of the Oval, originally all American elm.


International Trees: In addition to some aforementioned species, SMA trees not native to North America include English oak, Norway spruce, several Japanese *Prunus* species, and, inside the University Center, a kapok and a false monkey puzzle tree or bunya-bunya.

Gardens: The Montana Native Plant Gardens, which encircle the Natural Sciences building, feature approximately 300 plant species from various Montana habitats, including Aspen Woodland, Mesic Forest, Mixed Conifer Forest, Foothill Shrubland, Montane Parkland, Prairie, Alpine, Cedar Forest, and Wet Meadow. Here you can see bitterroot, twinberry, Rocky Mountain iris, red globemallow, and many others. The SMA also features ethnobotanical, medicinal, and Native American gardens.



Many trees at the SMA predate the arboretum designation and could be said to be growing in the "wrong" place—outside of their correct forest region. The SMA's policy is not to remove but to replace them after their natural lives. Doubling as a college campus presents challenges for SMA trees, including their removal during construction; protection of existing trees during the same; vandalism and other injury; piled snow during winter; and soil compaction from foot traffic. Advantages include, among others, abundant watering, thanks to turf care; protected spaces for delicate species, created by buildings; and

the potential for many interested visitors and volunteers to enjoy and care for them.

Lists of specific tree and plant species at SMA may be available in future for visitors and/or appear in another issue of *Kelseya*. Thanks to Kelly Chadwick, Adam Coe, Caroline Kurtz, Karen Shelly, Peter Lesica, Ken Stolz, and Madeline Mazurski for help with this article. 

Beth Judy is host and producer of "The Plant Detective" on Montana Public Radio. Her most recent book is "Bold Women in Montana History."

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

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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. All items should be emailed to: carokurtz@gmail.com or mailed to *Kelseya* 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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