

Kelseyia

Newsletter of the Montana Native Plant Society



Kelseyia uniflora
ill. by Bonnie Heidel

SMALL GRANT REPORT

Exploring Mosses and Lichens in Musselshell County

By Andrea Pipp, Botanist, Montana Natural Heritage Program

What is a healthy landscape and how do you manage for one? This is a question that Bill and Dana Milton have been asking for more than 30 years as they work to maintain a profitable livestock ranching operation in Musselshell County that is healthy for both land and family. Since purchasing their land in 1978, the Milton family has collaborated with ranchers and scientists to return the range to native prairie and to develop a grazing management system that incorporates plant monitoring and promotes biological diversity. Today their ranching operation grazes about 450 head of cattle on nearly 15,000 acres of rolling grassland that is in part privately owned and in part leased from the Bureau of Land Management (BLM) and the State of Montana.

Inspired by a request from Bill to have their ranch surveyed for mosses and lichens, I contemplated how to make this happen. In this part of central Montana, biological soil crusts and crustose lichens that grow on rock rule! It would take a team with special skills to find and document these tiny organisms. This would be no job for the faint of heart.

A review of data housed at the Montana Natural Heritage Program (MTNHP), and recent research by Bruce McCune (McCune et al. 2014) and Joe Elliott (Elliott 1993 and 2017), revealed that only one lichen (*Monoblastiopsis nigrocortina*, Caleb Morse 2008 in McCune et al. 2014) and no bryophytes have been recorded for Musselshell County. Could it be that a county of



Milton Ranch moss and lichen survey team. Top row (left to right): Bruce McCune, Katherine Glew, Rob Smith, Roger Rosentreter, Dana Milton, Bill Milton, Daphne Stone, Andrea Pipp, Wildfire Wanderning; bottom row (left to right): Ann Debolt, Wendy Velman, and the Milton's dogs. Photo courtesy of Andrea Pipp.

rolling grasslands, rock sculptures and scattered tree groves had no bryophytes and only one lichen? After all, since the 1880s many famous botanists and biological expeditions have travelled Montana to catalogue mosses, liverworts and lichens. It is more likely that these collectors were lured to the majestic mountains, lakes, and the timber-rich habitats of western Montana in search of their quarry, rather than the open plains. Among today's botanists and plant enthusiasts who work or play in the Pacific Northwest, there is a network of folks passionately interested in bryophytes and lichens, many of whom belong to a group called Northwest Lichenologists (northwest-lichenologists.wildapricot.org). Could I persuade this group to come as far as eastern Montana to help us?



Chapter Events

Calypso Chapter

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

Saturday, April 29, 10:00 a.m. “Gardening with Natives Workshop.” Jump into spring with Calypso Chapter’s 8th annual spring workshop, featuring speakers, garden books and a great selection of native plants, vegetable and flower seeds for sale. Bring a lunch and water. Meet at the Grange Hall in Divide, MT. Info and to register: Catherine at 498-6198, nativeplants@montana.com.

Sunday, May 7, time TBA. “Native Garden Monitoring.” Care of the Chapter’s native garden in the median strip on Helena Avenue in Dillon continues throughout the summer. Bring gloves, a digging tool, and help weed out old non-native perennials and encourage the native plantings in their fourth year. Info: Catherine at 498-6198, nativeplants@montana.com.

Saturday, June 10, time TBA. “Occidental Plateau and Bluebird Flats.” This area forms a moderately high park located along the Continental Divide west of Jefferson City, with views into the Prickly Pear Creek valley to the east and westward across the Boulder Batholith. Bedrock appears to be granodiorite and Elkhorn Mountains volcanics. There are wet meadows along Cataract Creek to the west and typical Douglas-fir/Lodgepole forest with some ponderosa to the east. Join leader Mike Gaverich, retired NRCS geologist/botanist, for this trip that will focus on native plants and regional geology. We will get an early morning start and try to avoid late afternoon showers at this elevation. This is a good trip for Helena-based Kelsey Chapter folks, too! Info: Mike Garverich at 491-0887.

Clark Fork Chapter

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

Thursday, April 13, 7:00 p.m. Montana Natural History Center’s Lisa Bickell will introduce us to their new native garden and how she went about “Building a Native Plant Garden for Play and Education.” Room L09, Gallagher Business Bldg., UM Campus.

Saturday, April 15, 1:00 p.m. MNHC’s Lisa Bickell will take us through their new garden and tell us about the design process and the native plants specifically chosen to fit and thrive in a children’s play area. Montana Natural History Center, 120 Hickory Street.

Thursday, May 11, 6:30 p.m. This year our Spring Potluck will be held at the Pineview Park Pavilion in the Upper Rattlesnake, 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. Info: Peter at 728-8740 or Clare at 728-0189.

Eastern At-Large

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

Saturday, June 17, 8:15 a.m. “North Fork of Dupuyer Creek.” This hike is a three-mile stroll through prairie and foothill wildflowers, across the Old North Trail and grizzly country. The hike is on the Boone & Crockett Club’s Theodore Roosevelt Memorial Ranch, and will cross the prairie toward the 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 should see more than 75 species of wildflowers, as well as tipi rings and the Old North Trail. Meet at the Choteau Information Center near the Old Trail Museum in Choteau. Info: Dave Shea at 466-2161. Co-sponsored by the Montana Wilderness Association.



Post-meeting field trips will focus on native prairie plant communities. Photo courtesy of Wayne Phillips.

Sunday and Monday, June 25 and 26, 3-6 p.m. and 9 a.m.-noon. Following this year’s Annual Membership Meeting, Wayne Phillips will lead two field trips on the American Prairie Reserve, near Malta. Look for complete details in the MNPS Summer Field Trip Guide (coming in May).

Flathead Chapter

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

All programs take place at the North Valley Community Hall, 235 Nucleus Avenue, Columbia Falls (look for North Valley Physical Therapy sign) unless otherwise noted. Programs are free and open to the public. Come early for a 5:30 p.m. general meeting to discuss Chapter business and projects. Bring a sack dinner if you wish.

Wednesday, April 19, 7:00 p.m. “A Phytocentric Hawaiian Vacation.” Peter Lesica is a Missoula-based botanist and author of many books, including the “Manual of Montana’s Vascular Plants” and “Flora of Glacier National Park.” His vacations center around hiking and, of course, native plants. Spend an evening with Peter as he shares his plant wisdom with us from a journey to Hawaii.

Tuesdays in May, 10:00 a.m. “Swan River Nature Trail.” It’s worth taking a stroll along this trail, especially with plant lover Anne Morley. Stop, look, listen and learn. Binoculars and a hand lens

could make this gentle adventure even more enjoyable! Meet by the bench between the Playhouse and Show Thyme Restaurant, Big Fork. Info: Anne at 886-2242.

Wednesday, May 17, time TBD. Field Trip TBA.

Saturday, May 20, 8:30 a.m. “Glacier National Park Volunteer Day.” Join the GNP Volunteer Associates park-partner group on their annual volunteer day. A continental breakfast at 8:30 is followed by the annual meeting at 9:00 a.m. After that, volunteers split into work groups and help with projects that range from park facilities maintenance and trail work to working at Glacier’s Native Plant Nursery. Info: Cheryl Klein at 270-4189, cheboklein@att.net.

Saturday, May 20, 9:00 a.m. “Johnson Mountain Terraces Stroll.” There has to be wildlife lurking in the forest surrounding Johnson Mountain Terraces! This is a native plant landscape photographer’s mecca. In addition, Betty Kuropat can teach you scientific and common plant names, while introducing you to some unique flora. This outing is a two-mile round-trip walk and one-hour drive each way. Bring lunch. Meet at the Grouse Mountain Lodge tennis court rest area parking. Info: Betty at 892-0129.

Thursday, June 1, 10:00 a.m. “Sprunger-Whitney Nature Trail Stroll.” Named for two conservationists, this trail is a tapestry of old growth forest. Historically a Pend d’ Oreille and Bitterroot Salish Indian trail, a portion of it was later used by Lewis & Clark. Meet at the Springer-Whitney trailhead. Take Highway 83 approximately seven miles south of Swan Lake; half a mile south of mile marker 64, turn right at the Point Pleasant Campground. Follow signs to the trailhead. Info: Anne at 886-2242.

Thursday, June 1, 6:00 p.m. “Columbia Mountain Evening Wildflower Walk.” Join the Flathead Chapter and Montana Wilderness Association for a three-hour evening wildflower walk. From showy larkspurs to diminutive mitreworts, the Columbia Mountain trail is a flower-lover’s paradise. We’ll travel two-and-a-half miles at an easy pace and make lots of stops to view flowers growing in shady, sunny and wet habitats. This trip is limited to 12 people; reservations required. Meet at the Columbia Mountain trailhead. Register: www.wildmontana.org/walks. Info: Ellen Horowitz at 752-2909, horowitz@centurytel.net, or Grete Gansauer at 726-3931, ggansauer@wildmontana.org. Co-sponsored by the Montana Wilderness Association.

Wednesday, June 14, 6:00 p.m. “River’s Edge Park Evening Stroll.” This could be the perfect opportunity for learning after a hard day in the office or just to relax in a park along the Flathead River. Join Rachel Potter for an hour or two looking at trees and shrubs, searching for wildflowers in moist sloughs, and exploring the Flathead River’s rocky floodplain. Bring a sack supper to eat along the banks of the river as we discuss what we have seen. If you can stay for a bit of knapweed pulling, bring gloves and tools. Meet at River’s Edge Park parking lot, 5th Street E, Columbia Falls. Info: Rachel at 892-2446, jrepotter@centurytel.net.

Kelsey Chapter

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

Date and time TBD. “*Kelseya uniflora* Field Trip in Trout Creek Canyon.” For several years, we have hoped to conduct a field trip to see the MPNS botanical mascot in full bloom, but the uncertainty of spring weather has foiled our attempts. This year, we plan to begin early monitoring of the plants and will organize a trip when things look optimal. This could happen anywhere from mid-March to the end of April. Keep watching the Kelsey Chapter page on the Montana Native Plant Society website or your Kelsey Chapter email for updated information. Info: Bob Person, see above.

Wednesday, April 19, 7:00 p.m. “Spring Wildflower Tune-up.” As spring sets in, hikers take to the hills on Helena’s extensive trail system. As the brightly colored spring flowers pop up along the trails many people need an ID refresher. Chapter members Mary Johnson and Bob Person are ready with a program to tune-up your recall and maybe add a few species to your memory banks. Meet in the large meeting room at the Lewis and Clark Library, Helena.

Wednesday, May 24, all-day. “Celebrating Wildflowers.” Here is a super volunteer opportunity. For many years the Kelsey Chapter has worked with the National Forest and the Montana Discovery Foundation to offer a wildflower walk for 4th graders on a designated route on Mount Helena. Wildflower lovers who would like to lead one or two walks with the schoolchildren, please contact Bob Person, Kelsey Chapter, or Debbie Anderson, Montana Discovery Foundation, for more information.

Thursday, May 25, 7:00 p.m. “Mount Helena Wildflower Walk.” Following the same route used for the previous day’s “Celebrating Wildflowers” program, Bob Person and other Kelsey Chapter members will lead a wildflower walk and point out the most prominently blooming plants. It’s a little different every year, but we expect to see a wide variety of species. This event is co-sponsored by the Montana Discovery Foundation and the Prickly Pear Land Trust. Meet at the Mount Helena main trailhead above Reeder’s Village.

Saturday, June 10, time TBA. “Occidental Plateau and Bluebird Flats.” See info under Calypso Chapter.

Maka Flora Chapter

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

Friday-Sunday, June 23-25. “On The Edge.” 2017 MNPS Annual Membership Meeting, near Lambert, MT. See registration insert for details.

Valley of Flowers Chapter

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

Tuesday, April 11, 7:00 p.m. “The Company You Keep!” MSU mycology professor Cathy Cripps is an internationally-renowned expert on the fungi of alpine and subalpine areas,

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MNPS News

2017 Small Grants

Four Outstanding Projects Selected

By Betty Kuropat, Small Grants Committee

February is always a busy month for the Small Grants Committee as members read, rate, discuss and finally agree upon which proposals to recommend to the MPNS Board of Directors. The Small Grants Program has specific criteria to determine how the proposals “stimulate research, conservation and educational activities that foster an appreciation of Montana’s native plants and plant communities, and...promote native plant conservation through a better understanding of Montana’s native flora and vegetation and the factors affecting their survival.” The Board then approves or modifies the committee’s recommendations based on budget and merit of the proposals.

This year, we are pleased to award four grants out of 12, very worthy proposals. These included four graduate and two undergraduate research projects, four educational gardens or garden workshops, a monitoring project, and an educational brochure. Congratulations to the four winners; we look forward to hearing more about these projects:

Burke Park Vegetation Monitoring. Jeff Copeland and Jeanne Knox plan to monitor the vegetation on Peet’s Hill, a remnant native sagebrush steppe habitat in Bozeman’s Burke Park. This year’s monitoring will re-locate, permanently mark, photograph and re-measure transects that were established in 2004 and 2013. The objectives are to document changes in plant species diversity and abundance over time, assess long term impacts of herbicides on plant diversity and abundance, provide data to help determine the role of exotic species in changing native plant species and abundance, and permanently mark each transect. The MPNS grant will help pay for materials to mark the transects and digitally store the results.

River Stewardship Workshop in Lake County. This project addresses basic concepts of riparian health, riverbank stability, and river and natural resource stewardship. Professionals from local natural resource organizations will provide an overview, highlighting specific strategies to address bank stability, riparian health and native vegetation on private riverfront properties. Following the seminar, participants engage in a hands-on restoration project at a county park on the Swan River. The MPNS Small Grant will help pay for printed materials, transportation to the demonstration site, planting stock and materials, and lunch for participants.

Promoting Botanical Literacy in a Mountain Community. The Whitefish trail system offers an extensive network of multipurpose, non-motorized trails that are used throughout the year for recreation and educational programs. There are more than 48 miles of trail and 10 trailheads. The primary goal of this project is to create a pictorial plant guide that will serve as an educational resource for the community. Flathead Valley Community College Botany Professor Mirabai McCarthy and her students completed floristic surveys for the entire trail system and documented about 170 species between April and October, 2016. Now they are organizing data and photos to prepare the “wildflower guide.” The Small Grant will help cover printing costs.

YES Native Plant Garden. Karen McCarthy, executive director at Youth Empowerment Services in Anaconda, plans to lead the Youth Work Team Program and will mentor youth participants as they turn an unused, barren area near the entrance to their center into a native plant garden. This future “tranquil” garden will be enjoyed by both center and community members, and will develop a peaceful, beautiful area in town where citizens, young and old, can enjoy plants native to our state. McCarthy and her team are planning field trips to visit native plant environments, where the young naturalists can learn about the importance of conserving these beautiful resources. The Small Grant will help buy seeds, plants and landscaping materials.

The MNPS Financial Picture

By Gretchen Rupp,
MNPS Vice President

The Montana Native Plant Society is fiscally healthy. At the end of 2016 the organization had a bit more than \$40,000 “in the bank,” following approximately \$16,000 of financial activity during the year.

The chief sources of revenue for MNPS are membership dues, the Annual Membership Meeting, and, every other year, the Montana Plant Conservation Conference. The suite of activities on which we spend money is more varied and includes our *Kelsey* newsletter, the Annual Meeting, Small Grants program and the Plant Conservation Conference. It should be noted that several “annual” expenses can vary considerably between years. For example, the total grant expenditure averages \$4,500 per year, but the year a grant is “booked” depends on when the project concludes. Some Annual Meetings require a subsidy from the statewide organization, while others do not. Co-Treasurers Jenny Tollefson and Shannon Kimball manage our funds carefully, and the Board of Directors develops the annual budget and tracks fiscal matters at each meeting.

2017 Election We Need a Vice President!

By Betty Kuropat,
Nominations Committee Member

The nominations committee is pleased to have found abundantly capable officer candidates for you to vote on this spring (see ballot insert).

Now, we have one more opportunity for someone interested in dipping his or her toe into MNPS business. Our current Vice President, Gretchen Rupp, is running for President. If elected, she will step down from her VP duties. The MNPS Board of Directors won't run a special election ala our current U.S. Representative race, but they will need to appoint a VP for one year to finish the term, which ends June, 2018. If you'd like to start out gently, VP is probably the easiest job on the Board of Directors. Contact Gretchen Rupp, Betty Kuropat or Rachel Potter if you would like more information (see back page of this newsletter for contact info).

Fill Out Your Ballot!

By Rachel Potter, MNPS Secretary

As you can see from the accompanying ballot insert, President Kathy Settevendemie is stepping down after four years leading us with exemplary energy, enthusiasm and resolve. Jon Reny is retiring as the Western Representative-at-Large. He has been the voice on the Board since 2013 for folks on the west side of the state who are not represented by a Chapter. We thank them both for their years of service. In their stead, we are pleased that current Vice President Gretchen Rupp has agreed to run for President. And we look forward to getting to know Pat McLeod from Troy, who is running for Western Representative-at-Large.

There are many ways to become more involved with MNPS: consider serving one year as Vice President (see above), or write-in yourself or someone else you think would be good for any of the vacant Board positions, or get more involved with your local Chapter. Please fill out and mail the enclosed ballot, or do it online at www.mtnativeplants.org. Results will be announced at the Annual Membership Meeting in June.

Spend Time "On The Edge" 2017 AMM

By Libby Knotts,
Maka Flora Chapter

THE MAKA FLORA CHAPTER IS HOSTING THIS YEAR'S ANNUAL MEMBERSHIP MEETING, June 23-25! Come help us celebrate 30 years of the Montana Native Plant Society with explorations of the plains, badlands and hardwood draws of eastern Montana. You'll find the registration flyer within this newsletter.



Photo courtesy of Libby Knotts

Be sure also to visit the Annual Membership Meeting page on the MNPS website at www.mtnativeplants.org. There, you can register online and find updated meeting information. Plus, there is information about places to visit and things to do on your way to and from the eastern edge of Montana. For example, Wayne Phillips plans to lead botany hikes at the American Prairie Preserve immediately after the meeting, and other options are in the works. Check in occasionally to the MNPS Facebook page, as people may be coordinating their across-Montana trips there. Finally, we have set up a carpooling site at <https://www.groupcarpool.com/t/hzutdo>. If you would like to offer a ride to the annual meeting, or if you need a ride, please go to that site and register – it's very easy to do. We look forward to seeing people in June!

In Memoriam Jean Parker, 1926-2017

JEAN PARKER, A LONG TIME CONTRIBUTOR TO THE EFFORTS OF THE MONTANA NATIVE PLANT SOCIETY, particularly our native gardens on the University of Montana campus, passed away on January 31. From her *Missoulian* obituary, 2/7/17:

Jean had a strong affinity for native plants. When Professors Sherman Preece and Klaus Lackschewitz began planting native plants near the University of Montana's Natural Sciences annex and greenhouse in 1967, Jean was an enthusiastic supporter.

Following Lackschewitz's retirement, the native plant gardens were dormant until the late 1980s when Jean, together with her friends Jean Pfeiffer, Sheila Morrison, Louis Puckett, Chin Won Reinhardt, Peter Stickney, Kelly Chadwick and other volunteers from the Montana Native Plant Society, stepped up to save them. Jean took particular care of the forest shade garden.

In celebration of Jean's life and nurturing spirit, please consider visiting the native plant gardens at the University of Montana, and contributing to or volunteering with the Montana Native Plant Society. If you wish to make a contribution, please mail it care of Montana Native Plant Society, PO Box 8783, Missoula, MT 59807, and designate "Gardens" on the gift.





More Than Dead White Guys

“Montana’s Pioneer Botanists: Exploring the Mountains and Prairies,”

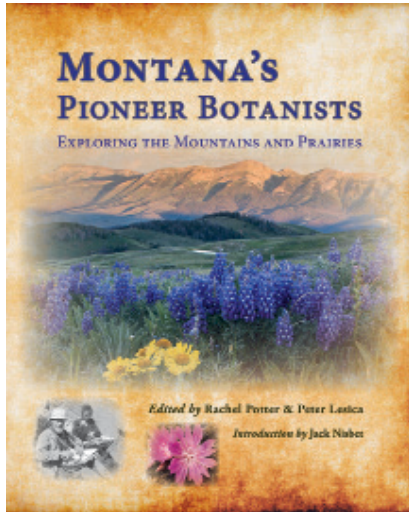
Rachel Potter and Peter Lesica, Editors.

Nearly thirty years ago, Arthur Kruckeberg (1920-2016) envisioned a book of biographies of historical Northwest plant hunters, with essays written by botanists of today. He asked Peter Lesica to recruit authors for stories of Montana’s botanists, and a dozen or so essays were written or drafted. As the years went by and there was no sign of a Pacific Northwest book, Peter decided to publish the Montana essays and asked Rachel Potter to help. We recruited a few more authors and revised some essays to highlight Montana.

When we decided to add plant and landscape photos and art to the portraits of dead white guys, the project flourished from the work of different authors into a vital community effort with many more people donating photos, artwork and expertise. The majority of the contributors are members of the Montana Native Plant Society.

Montana is a large state with diverse vegetation, from Great Plains prairie and deciduous forest in the east to northern coniferous forest and alpine tundra in the west. Discovering the botanical secrets of this spectacular landscape began with indigenous peoples and continued through the 20th Century with early explorers, geographers and entrepreneurs, followed by teachers, scientists, and curious and dedicated lay persons. Montana’s multitude of rugged mountains and wide open spaces means that botanical discoveries that started with the Lewis and Clark Expedition continue to this day. “Montana’s Pioneer Botanists” brings together more than 30 biographies of these diverse people and traces the growth of botanical knowledge in this wild and beautiful state.

We are grateful to the Board of Directors of the Montana Native Plant Society for funding the project and publishing the book, a fitting celebration for the 30th anniversary of MNPS. The book will be available at the 2017 Annual Membership Meeting, and from MNPS Chapters afterward. The MNPS Board decided to keep the cover price low, compared to the cost of producing the book: \$29.95, \$25.00 to MNPS members. If you have suggestions for retail outlets (historical societies, etc.), please contact Rachel at jrepotter@centurytel.net.



especially those that live in partnership with higher plants. She’s also a dynamic, popular foray leader and speaker. Come hear her discuss the wide-ranging and weird partnerships between fungi and higher plants, and what her research group is discovering about fungi’s role in Montana native plant communities. Room 108, Plant Bioscience Building, MSU. Info: Gretchen Rupp at 586-8363, beesgrmt@gmail.com.

Saturday, April 22, 9:00 a.m. “Clean Up Bozeman Day (Earth Day).” We’ll continue our long-running (and winning!) battle with spotted knapweed and other invasive plants on Bozeman’s Kagy Boulevard roadcut and one other close-by spot. Afterward, we’ll move to the Pollinator Garden in Langohr Park for its spring cleanup. Meet at the roadcut, just east of Kagy & South Church (park on S. Church). Bring a digger, garden clippers and gloves. Info: Joanne Jennings at 586-9585.

Sunday, May 7, see times below. “The Hogback, Paradise Valley.” Climb the ridge trail atop this prominent geological feature on private land in the foothills on the west side of the Paradise Valley. The south face of this steep, knife-edged ridge hosts rocky, xeric plant communities, while the north side supports coniferous forest and associated understory plants. Moderately strenuous two to four miles walking, elevation gain of 1,500 feet (to about 6,600 feet). Hiking poles may be helpful for steep sections; rattlesnakes are present. This hike affords fabulous views of the Paradise Valley and Absaroka Mountains, and is a popular launch point for hang gliders. Meet at the Bozeman Softball Complex parking lot, on the east side of Highland Boulevard across from the hospital at 8:15 a.m., or the Albertson’s parking lot (NE corner) in Livingston at 9 a.m. Info: Beth Madden at 224-1012, bethmadden64@gmail.com.

Saturday, June 3, 10:00 a.m. “Spring Wildflower Tune-Up.” That flower is really familiar, but...I just can’t bring up the name! For a low-key refresher, spend two or three hours strolling through varied habitats at the base of Mt. Ellis with Jeff Copeland. Blooming wildflowers will be abundant and diverse. This will be an easy walk: approximately three miles on a gentle slope, with some off-trail bushwhacking. Meet at the Bozeman Softball Complex parking lot, on the east side of Highland Boulevard, across from the hospital. Info: Jeff Copeland at 539-6029, jouzelcopeland@gmail.com.

Western At-Large

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

Look for upcoming events in the MNPS Summer Field Trip Guide, coming in May.

With an invitation from the Milton family that included meals and lodging, and transportation funding from the Montana Native Plant Society and Bureau of Land Management, a group of lichenologists, bryologists and botanists gathered at the Milton Ranch, northeast of Roundup, in mid-September, 2016, to conduct the first documented bryophyte and lichen surveys in Mussellshell County. From Oregon came Bruce McCune, author and professor at Oregon State University; Daphne Stone, consulting lichenologist and bryologist; and Rob Smith, doctoral candidate at Oregon State University. From Washington came Katherine Glew, lichenologist and retired teacher. From Idaho came Roger Rosentreter, retired state BLM botanist and adjunct faculty member at Boise State University, and Ann DeBolt, retired BLM botanist. From Montana came Wendy Velman, state BLM botanist for Montana; Wildfire Wanderning, assistant botanist at MTNHP; and myself. Additional help on moss identification came from Joe Elliot, consulting botanist and bryologist, and Patricia Eckel, bryologist for the Missouri Botanical Gardens.

At the Milton headquarters, I turned the guest house into a laboratory, setting up dissecting and compound microscopes, a library of books and published articles, and an assortment of field and laboratory equipment. For three full days, the group spent their mornings surveying and collecting specimens and their afternoons into late evenings identifying them. Working in pairs we surveyed the soil, rock, bark and wood found in open ponderosa pine stands, sandstone rock outcrops, native grasslands, fields of crested wheatgrass undergoing restoration, shrublands of yucca, sagebrush and greasewood, cottonwood groves, and old ranch fences and sheds. We found a landscape rich in habitats colonized by a diversity of mosses, lichens and cyanobacteria – but no liverworts. Although some of the roughly 430 specimens are still under examination, the group identified at least four free-living cyanobacteria species, 28 moss species and 111 lichen species!

Many noteworthy species were found, including vagrant range lichens belonging to genus *Xanthoparmelia*; a very prevalent, yet sterile species of reindeer lichen, *Cladonia pocillum*; the rare moss, *Pseudocrossidium obtusulum*; and the first Montana record of the moss *Didymodon tectorum*. Vagrant range lichens are the most conspicuous soil-dwelling lichens on the ranch. They provide food



Above: Bill Milton has a grazing rotation of about three days and his series of paddocks are bounded by single-wire electric fences. You can see one of these fences above.



Left: Vagrant range lichens, like this common wide-lobed *Xanthoparmelia chlorochroa*, live unattached to soil or rock. Photos courtesy of Andrea Pipp.

We found a landscape rich in habitats colonized by a diversity of mosses, lichens and cyanobacteria – but no liverworts.

for pronghorn and live by tumbling across the prairies. When dry, their bodies curl and blow with the wind. In rain, they uncurl and photosynthesize. We believe our specimens represent five species. To further the understanding of these strange organisms, our specimens were sent to Steve Leavitt at Brigham Young University to be included in his molecular study of *Xanthoparmelia* lichens. Observation data on each identified specimen are currently being entered into the botany database at the MTNHP, and at least one specimen of each species is being curated for the University of Montana herbarium (MONTU).

Surveys were conducted not only to document species, but to complement other vegetation studies. Thus, some of us surveyed near BLM/Milton Ranch's rangeland monitoring transects and Montana Fish, Wildlife & Park's Greater Sage Grouse vegetation plots. Rob Smith not only came to survey, but to implement the Ground Layer Indicator Method that he developed with the U.S. Forest Service's Forest Inventory Analysis Program. This non-destructive method assesses the structure and type of terrestrial bryophytes and lichens on the ground without the need to identify species.

These living crusts create a layer of resiliency that glues together soil particles and intercepts the erosive forces of wind and rainfall. Using the Ground Layer Indicator Method, we quantified the

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Artemisia tridentata ssp. *wyomingensis* on the Missouri River.

Sagebrush Talk

Story and photos by Peter Lesica, Clark Fork Chapter

Sagebrush steppe is a dominant vegetation type at low and mid elevations across all but the northernmost portions of our state. Although these landscapes may seem monotonous at a distance, there's a lot going on. Rabbits are hiding from coyotes, sage grouse are raising their young, bull snakes are waiting for an unsuspecting vole, and Brewer's sparrows are singing to their potential mates and competitors. We can see and hear all of this activity, but there's a lot going on that we can't detect, and it has to do with the plants. For several decades now, biologists have been exploring the ways in which plants communicate. Foremost among them has been Richard Karban at the University of California-Davis. Twenty years ago Karban and his colleagues began studying mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and its insect herbivores. Every few years they have discovered something unexpected about sagebrush.

It has long been known that damage to one leaf on a plant often induces nearby leaves to become more resistant to herbivory through a message chemical transported by the plant's vascular tissues. Karban et al. found something new. They found that volatile gases given off by damaged leaves of sagebrush caused neighboring native tobacco plants (*Nicotiana attenuata*) to become more unpalatable to the grasshoppers that feed on tobacco as well as sagebrush. When air movement between the damaged sagebrush and the neighboring tobacco was curtailed, the tobacco did not experience induced resistance to insect herbivores. Apparently wounded sagebrush was providing an air-borne warning signal that neighboring plants of a different species were able to respond to.

This phenomenon has been termed "eavesdropping," and is result of volatile chemicals emitted into the air.

Next, Karban and his colleagues asked whether sagebrush plants eavesdropped on each other. In other words, did damage to one sagebrush plant induce resistance to insect herbivory in neighboring plants? They clipped the leaves of a "focal" sagebrush and then measured insect damage to nearby plants. Sagebrush plants within two feet of the focal plants had reduced herbivory compared to plants farther away. When they inhibited air flow between the focal plants and close neighbors, the effect disappeared. Furthermore, a damaged branch of a sagebrush individual resulted in nearby branches of the same plant increasing their resistance to insects, but not if the damaged branch was enclosed in a plastic bag. So a damaged sagebrush branch communicates its distress to other branches of the same plant through airborne volatile chemicals, and close neighbors, whether other sagebrush or tobacco plants, eavesdrop and prepare for the worst.

Many plants communicate herbivore damage by sending chemical messages through their internal vascular system, and to hell with eavesdropping. Why does sagebrush use volatile cues instead? One reason might be that branches of sagebrush are not well integrated by vascular connections. However, Karban et al. had another idea. They used genetic fingerprinting to show that most of the time, in dense sagebrush stands, plants within two feet of each other are close relatives; e.g., siblings or cousins. Most recently they found that volatile messages that prompt resistance to herbivores in one population were less effective in a different

population 150 miles away. Apparently the combination of volatile chemicals is variable, and the more closely related a sagebrush plant is to the focal plant, the more likely it is to eavesdrop. In this way the eavesdropper benefits by being made aware of a likely threat, and the focal plant that emits the volatile cues benefits by helping to protect its close relatives that are likely to pass on some of its genes. These studies suggest that individual sagebrush plants may be thought of as communicating with local dialects, similar to those observed in the songs of birds. The next time you're walking through a dense stand of sagebrush after a rain and you get a whiff of that great smell, keep in mind that for the sagebrush plants that odor is their equivalent of a Facebook post, but without the advertisements or fake news.

ADDITIONAL READING

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Mountain big sagebrush can provide air-borne warning signals about insects to other plants.



components and structure of the crust in five different habitats. A preliminary analysis of the living crusts found an average biomass ranging from about 11 kilograms per hectare (kg/ha) in a crested wheatgrass field to 386 kg/ha in a grassland-sagebrush habitat. Despite the difference in biomass, the number of functional groups remained similar, varying from 9 to 11 groups. The types of functional groups found included nitrogen-fixing crustose lichens (fix atmospheric nitrogen), foliose macrolichens (provide invertebrate habitat and cover bare soil), fruticose macrolichens (provide forage for wildlife and habitat for invertebrates), upright turf mosses (accrue soil and colonize bare soil), loose turf mosses (intercept precipitation and cool soil temperatures), soil crusts (intercept precipitation and are a disturbance indicator), rock crusts (influence rock weathering and soil formation), *Nostoc* cyanobacteria (fix atmospheric nitrogen and are early successional indicators), crust cyanobacteria (fix atmospheric nitrogen), crust binding lichens (bind together mosses, lichens and soil organic matter), and orange crust lichens (nitrogen-loving lichens that colonize bare soil). A more in-depth analysis of the data is underway.

Although many habitats on the Milton ranch remain to be surveyed, including the system of ephemeral and perennial streams, this project documented at least 143 moss, lichen and cyanobacteria species living in Mussellshell County. At the basic level, this inventory informs us of the species that live on this working ranch, and this contributes to our knowledge of their distributions and ecology. This data along with our photographs are being used to update the Moss and Lichen Field Guides on the MTNHP website, and to create a field guide for the Milton Ranch's website (miltonranch.weebly.com). For the Milton family, their website illustrates the biological life on their ranch and serves as a management tool for teaching the next generation. This project also provides insight into the ecological contributions made by biological soil crusts in Montana, and provides baseline data for grazing management. It is through collaboration between land managers and scientists that we can develop an awareness of the life around us, understand our interactions, and manage for a sustainable environment.

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Elliott, J. 1993. A Checklist of Montana Mosses. Prepared by Conservation Biology Research, Helena, Montana. 45 pp.

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For the Armchair Botanist

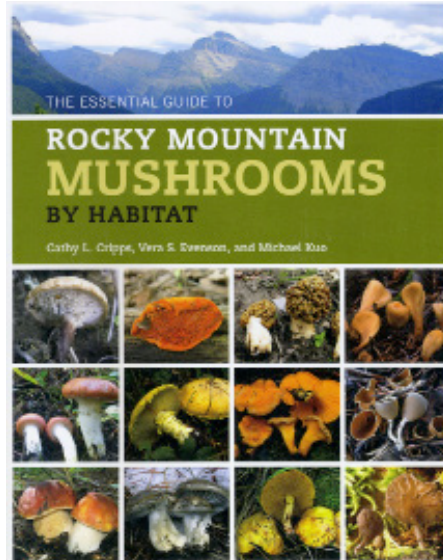
“The Essential Guide to Rocky Mountain Mushrooms by Habitat,”

by Cathy L. Cripps, Vera S. Evenson, and Michael Kuo (University of Illinois Press, 260 pages)

Review by Frank Dugan, USDA-ARS Plant Introduction, Washington State University

Once in awhile there appears a guide book that departs from convention and bestows a fresh look at familiar terrain. This is what Cripps et al. have done for Rocky Mountain mushrooms.

The authors divide the Rocky Mountains into broad ecological zones, subdivided into habitats (most frequently indicated by a dominant tree species), and present several mushrooms closely associated with a given habitat. Readers are oriented with photographs of trees, flowers, birds and mammals characteristic of each of the habitats. Critical environmental aspects are sketched, transforming the guide into a cursory lesson in Rocky Mountain ecology. For instance, the section on Lodgepole Pine Forests is followed by



the section on Burned Ground, a very logical progression in which the reader is instructed in fundamentals of lodgepole pine’s adaptation to periodic fire.

The large format (8 x 10 inches) permits color photographs of ample dimension (often exceeding 4 x 6 inches) with good resolution. Relevant features of each mushroom are displayed: upper surface of the pileus (cap), bottom surface (showing gills, pores or teeth) and general character of the stipe (stem, stalk). The color of the spore print is specified along with instructions on how to take a spore print. There are no descriptions of microscopic characters. The back of the book contains simple dichotomous keys, amply illustrated with small color photographs, guiding the reader to non-taxonomic groups of mushrooms (e.g., mushrooms with thin stalks, mushrooms with thicker stalks) with the species and corresponding page numbers listed. The keys are followed by a page that lists some common sense cautions on eating wild mushrooms. Several pages of references are followed by separate indices for fungi, plants and animals.

The division into broad ecological zones simplifies use of the guide for the botanical novice, and on the whole is a good thing. However, this degree of simplification presents difficulties. For example, “the presence of larch, western hemlock, western red cedar, and grand fir complicates forest types and mushrooms; these tree species are not covered.” Several boletes (mushrooms with pores on the bottom of the pileus) usually included in other mushroom guides have specific mycorrhizal associations with the omitted trees. Readers will not find in this guide the larch-specific *Suillus cavipes* (mock oyster, a well known edible species), *Suillus grevillei* (slippery jack, another well known edible mushroom associated with larch), *Boletus mirabilis* (the admirable bolete, a choice edible found in association with western hemlock) and some others, all occurring in the Rocky Mountains in association with the omitted trees. These omissions are something of a disappointment. I owe readers a disclaimer that my own conversion to mycology came with “on-the-road-to-Damascus” force when I used the first edition of Orson Miller’s “Mushrooms of North America” to identify *S. cavipes* fruiting under larch and proceeded to make a meal of them.

It has always surprised me that some people restrict their appetite for mushroom guides to a single volume. If you are such a person, this is probably not the guide for you. Several alternative guides contain more (but seldom better) photographs and more numerous species. However, I know of no guide providing a superior feel for “lay of the land” mycology. Traversing the contents, chapter by chapter, I truly felt immersed in the landscape, and many of the mushrooms were encountered as old friends in familiar neighborhoods. Now that it’s in my hands, I can’t imagine not having this book.

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The Montana Native Plant Society welcomes the following new members:

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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 *Kelsey*, the quarterly newsletter of MNPS. We welcome your articles, field trip reports, book review, or anything that relates to native plants or the Society. Please include a line or two of "bio" information with each article. Drawings should be in black ink or a good quality photocopy. All items should be emailed to: carokurtz@gmail.com or mailed to *Kelsey* Editor, 645 Beverly Avenue, Missoula, MT, 59801.

Changes of address and inquiries about membership should be sent to MNPS Membership, 398 Jeffers Road, Ennis, MT 59729. 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.

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