

Kelseya

Newsletter of the Montana Native Plant Society



Kelseya uniflora
ill. by Bonnie Heidel

Ten Things You Might Not Know About Ferns, But Wish You Did

By Walter Fertig, Utah Native Plant Society

[Reprinted with permission from the Spring 2015 issue of *Sego Lily*, the newsletter of the Utah Native Plant Society.]

FERNS ARE EASILY RECOGNIZED BY THEIR INTRICATELY DIVIDED, OR LACEY, FOLIAGE that makes an appealing accent in floral arrangements or shady gardens. But how much do you really know about ferns? The following annotated list of factoids will make you an expert on pteridology (the study of ferns) at your next dinner party, or whenever you might be tipping one back at your local fern bar.

1 Ferns are basically just a collection of leaves.

They do produce stems, but these are typically oriented horizontally rather than vertically, and are often below ground or just at the soil surface. Technically, the stem of a fern is a rhizome, and it is usually covered by scales, hairs or old leaf bases. Roots are present on the lower side of the rhizome, but they tend to be small and wiry. In the tropics, some ferns have thick, upright stems and resemble palm trees, but they never produce true wood or bark. Ferns also do not produce flowers or fruits.



Lady Fern (*Athyrium filix-femina*)

2 Ferns reproduce by spores rather than seeds.

Ferns are distant cousins of the flowering plants (angiosperms) and conifers (gymnosperms) and share some features, such as large, multi-veined leaves and complex internal plumbing of xylem and phloem. They differ, however in the way they reproduce. Flowering plants and conifers produce seeds, which contain a diploid embryo enveloped in nutritive tissue and protected by a hard seed coat. Seeds germinate into miniature versions of their parent plant. By contrast, ferns and other primitive vascular plants (including the clubmosses, spikemosses, quillworts and horsetails) reproduce by spores. Although they may look superficially like seeds, spores are significantly smaller and do not contain much food or an embryo. Upon germination, the spore gives rise to a nearly microscopic filament of cells or a tiny heart-shaped blob called a gametophyte that bears little resemblance to its parent plant.

3 Ferns alternate between haploid gametophyte and diploid sporophyte generations.

Like the spore it germinated from, the gametophyte phase is haploid, containing just half of the full chromosome complement of a mature fern plant. The gametophyte gets its name because it produces



Chapter Events

Calypso Chapter

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

Clark Fork Chapter

You can also find information about Chapter events and activities at www.facebook.com/MNPSClarkForkChapter/events, www.facebook.com/MTNativePlantSociety, and www.mtnativeplants.org.

Monday, January 11, 7:30 p.m. “Eastern Montana’s Grasslands and Grassland Birds, Conservation in a Changing Landscape.” Marisa Lipsey discusses how plants and birds have changed on the Northern Great Plains. This is a joint meeting with Montana Audubon. Rm 123, Gallagher Business Bldg., UM Campus (*note different day and place*).

Tuesday, January 26, 7:00 p.m. Herbarium Night. Dive into the revolutionary anatomy of the world’s largest plant family with Peter Lesica as he explores pappus and phyllaries of the Aster Family. Rm 303, Botany Bldg., UM Campus (*note new time*).

Thursday, February 11, 7:00 p.m. “Creating the Montana Native Plant, Noxious Weed and New Invaders Posters.” Botanical artist Nancy Seiler will tell us how she went about designing these interpretive posters for Missoula County. Rm L09, Gallagher Business Bldg., UM Campus (*note new time*).

Thursday, March 10, 7:00 p.m. “Understanding Natives for the Constructed Landscape” with Montana State University’s Tracy Dougher. Rm L09, Gallagher Business Bldg., UM Campus (*note new time*).

Thursday, April 14, 7:00 p.m. “Native Bugs on Native Flowers.” The Clark Fork Chapter and the Missoula Insectarium will host the first of these special nights. If you have some digital photos of an in-focus insect on an in-focus flower that you’d like to show, please email lesica.peter@gmail.com. Plant and insect experts will be on hand to identify unknowns. Montana Natural History Center, 120 Hickory (*note new time and different venue*).

Thursday, May 12, 6:30 p.m. Spring Potluck. *Save the date.*

Eastern At-Large

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

Flathead Chapter

Unless otherwise noted, all programs begin at 7:00 pm and take place at North Valley Community Hall, 235 Nucleus Ave., Columbia Falls.

Wednesday, January 20. “Huckleberries and Climate: Predicting the Future of an Important Bear Food.” From her field research and the use of remote cameras, Tabitha Graves, PhD, USGS research ecologist in Glacier National Park, will describe

the interacting influences of weather and site conditions on the distribution of huckleberries, as well as potential ways to include the public in her research. United Way Conference Room, Hwy. 2 West, Kalispell (*note different location, January only*).

Wednesday, February 17. “Recovery Strategies for Disturbed Native Grassland Landscapes.” Marilyn Neville is a native grassland restoration specialist from southwestern Alberta with extensive experience in reclaiming and restoring native plant communities following industrial disturbance. She gives an overview of the restoration tools, strategies and monitoring methods that have been developed.

Wednesday, March 16. Program TBA.

Wednesday, April 20. “Plants of Inland and Coastal Wet Belts.” Rachel Potter, founder of the Glacier National Parks Nursery and Revegetation Program, will share pictures and stories from kayak and canoe trips to B.C.’s Bowron Lakes Provincial Park and southeast Alaska’s Tongass Forest. Her program will be part travelogue, part plants.

Kelsey Chapter

Wednesday, January 27, 7:00 p.m. “January Winter Shrub Identification & Snowshoe, Part I.” Come learn how to distinguish different shrubs when they have no leaves, and discover the diversity in our neighborhood. Andrea Pipp, Montana Natural Heritage Program botanist, will bring some examples inside to teach you ID skills in a relaxed and fun setting. Then meet her again on Saturday for a snowshoe outing (see below). Part I is strongly recommended as a pre-requisite to the Saturday event. Free, open to ages 10 and up, all skill levels. Reservations are highly appreciated. Simperman Hall, Carroll College, Helena. Info: Andrea at 439-0284, apipp@mt.gov.

Saturday, January 30, 9:00 am. “January Winter Shrub Identification & Snowshoe, Part II.” We’ll stomp around on snowshoes in the Little Blackfoot area, exploring the riparian and forested areas and discovering what shrubs are around us. This event is co-sponsored by the Kelsey Chapter and the Montana Discovery Foundation. The Discovery Foundation can provide snowshoes (see details below) or you can bring your own. Bring water, snacks, lunch and appropriate attire (waterproof pants, sturdy boots, layer for weather). The exact meeting place and snowshoe location will be provided later. Reservations are required for the Saturday snowshoe by Tuesday, January 26. Contact Andrea Pipp at 439-0284 or apipp@mt.gov with the name of each attendee, best contact phone number (in case of weather changes), and to let her know whether snowshoes are needed. Please indicate attendees’ weight category (less than or more than 130 pounds).

Maka Flora Chapter

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

Valley of Flowers Chapter

Unless otherwise noted, all programs begin at 7:00 pm and take place in room 108, Plant Bioscience Building, west side of South 11th Ave., MSU Campus.

Tuesday, January 12. “Montana Native Plants in the Domestic Landscape.” Dr. Tracy Dougher, head of the Agricultural Education department at MSU, received an MNPS grant several years ago to conduct field research on an array of native plants as potential cultivars. That work blossomed into an entire research program. Come hear what she’s worked on and how the findings might be useful in planting new native landscapes. Info: Gretchen Rupp at 586-8363, beesgrmt@gmail.com.

Tuesday, February 9. Program TBA.

Tuesday, March 8. “Carnivorous Plants.” What better topic visit on a gloomy winter night and who better to guide us than a wetland expert? Join Heidi Anderson, botanist/wetland ecologist in Yellowstone National Park, for a foray among the meat-eaters of the plant kingdom. Heidi has worked as a plant ecologist in the Yellowstone ecosystem for a dozen years; before that, she was in the Midwest, exploring the bogs and fens where carnivorous plants are more common. The following morning at 7:15 am, she will visit with anyone interested in carnivorous plants or the plant communities of Yellowstone over breakfast at Main Street Over Easy, Bozeman. Info: Cathie Jean at 599-9614, cjean0456@gmail.com.

Tuesday, April 12. “Penstemons.” This will be a primer for the MNPS Annual Meeting in June, which will focus on these diverse and bewitching members of our flora.

Western At-Large

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

Chapter News



Kathy’s enthusiasm rubbed off on workshop participants who were eager to learn more about the mysteries of native plants.

Sowing Seeds of Spring

Submitted by Terry Divoky, Flathead Chapter

More than 30 people attended the Flathead Chapter’s November workshop on “Getting Native Seeds To Grow,” given by Kathy Settevendemie at the North Valley Community Center in Columbia Falls. People loved it and there was a ton of enthusiasm and positive energy in the room.

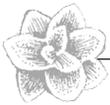
As Kathy explained, anyone can grow native plants from seed, all it takes is a little know-how. Learning what conditions each species needs for germination is an important part of that knowledge. She described gathering, cleaning and storing seeds, various germination treatments and techniques, and then participants got to choose and plant some seeds.

People departed happy with their “little gifts” of pots ready to put out for germination of brand new natives next spring. Kathy is a terrific and patient presenter who came from Bonner all the way to Columbia Falls two days before she was to leave on a long Caribbean adventure. Many thanks to her and to all participants who left their homes on a Wednesday night to come learn more about natives.



Left: Kathy explains some of the tricks of sowing native seed. Above: Lindy Key and Kathy Wilkinson try to decide which seeds to grow – not an easy task with so many choices.

Photos courtesy of Terry Divoky and Betty Kuropat.

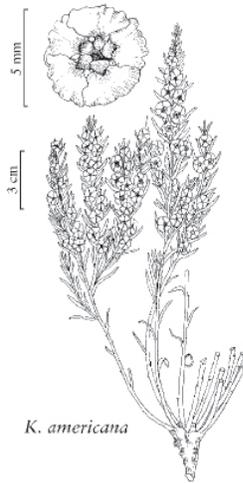


MNPS News

MNPS Continues to Engage ARS on Exotic Plants

Submitted by Peter Lesica, Clark Fork Chapter

The USDA Agricultural Research Service's (ARS) Forage and Range Research Laboratory (FRRL) held its annual focus group executive committee meeting in late September in Great Falls. The group consisted of representatives of the livestock and nursery businesses, U.S. Forest Service, Natural Resources Conservation Service and western native plant societies. One prominent topic of discussion in 2014 was the introduction of exotic species, such as forage kochia, for rangeland restoration. FRRL people reported this year that they are monitoring forage kochia plantings and developing protocols to mitigate its invasion into native rangelands. They have also started working on the possible use of native gray molly (*Kochia americana*) to perhaps replace forage kochia. FRRL is working on developing selections of five native legumes and on developing methods for harvesting and planting the seed.



K. americana

FRRL helped to develop a new interagency policy: Seed Strategy for Rehabilitation and Restoration 2015-2020 (http://www.blm.gov/wo/st/en/prog/more/fish_wildlife_and/plants/seedstrategy.html). The strategy is clear on the use of exotic species for restoration: "Although land managers in some agencies may plant nonnative species to achieve site stabilization, wildfire breaks or invasive plant control, the use of nonnatives should be limited to transitional, noninvasive species, replaced by natives in subsequent ecological restoration or during natural successional processes." If adhered to, this policy would make it much less likely that federal agencies would inadvertently introduce exotic species that escape and become detrimental to our native plant communities.

Funding, Presentation Opportunities from NWSA

Submitted by Andrea Pipp, Clark Fork Chapter

2016 Student Research Grant Competition

The Northwest Scientific Association (NWSA) annually awards grants to support student research in the pure and applied sciences. We award research grants up to \$750 for winning undergraduate [BA/BS] research proposals, and up to \$1,500 for winning graduate [MA/MS or PhD] research proposals. The NWSA encourages all graduate and undergraduate students engaged in regional scientific research to apply!

Applicants must be students and have a 2016 NWSA membership at the time the proposal is submitted. The deadline is midnight, January 15, 2016. For membership and grant information please check our website: <http://northwestscience.org>.

Call for Papers

Poster and oral presentations are being solicited for the joint meeting of NSWA and the Central Oregon Fire Science Symposium in Bend, Oregon to be held March 23-26, 2016.

The conference will explore "Living on the Edge of Change: Exploring the Dimensions of Restoring Fire Resilient Landscapes, Culture, & Economies on the Cascade Range's Eastside." This is a great venue to present your research and network with scientists representing academia, government agencies and non-profits who work in northwestern North America. We strongly encourage student participation.

Abstract submittal for oral and poster sessions is open December 3, 2015 – February 15, 2016. Details continue to develop, check us out at <http://www.northwestscience.org/>.

Plant Conservation Conference

Submitted by Andrea Pipp, Clark Fork Chapter and Conference Organizer

Mark your calendars for the 9th Montana Plant Conservation Conference, happening February 9-10, 2016 at the University of Montana in Missoula.

Montana's biennial Plant Conservation Conference treats emerging issues in applied botany for managers, scientists, students and plant enthusiasts. Join speakers from Brigham Young University, the University of Montana, the U.S. Forest Service and others as we explore "How Can Genetics Contribute to Plant Conservation?"

This conference will examine how plant genetics interacts with conservation, restoration, taxonomy, and management for terrestrial and aquatic plants. The conference is hosted by the Montana Native Plant Society and Montana Natural Heritage Program and sponsored by the U.S. Forest Service and Department of Biological Sciences at the University of Montana.

Details on cost and registration will be posted on the Montana Native Plant Society website (<http://www.mtnativeplants.org/>) and are available in this issue of *Kelseya* (see insert).

Illustration: Flora of North America. www.efloras.org



Small Grants Proposals Due Soon

Submitted by Betty Kuropat, Flathead Chapter

It's time to prepare and submit your proposals for the annual MNPS Small Grants competition. If you don't have a project in mind, you probably know someone who does — please share this information.

Small Grants are for projects or studies that: 1) stimulate research, conservation and educational activities that help foster an appreciation of Montana's native plants and plant communities; and 2) promote native plant conservation through better understanding of Montana's native flora and vegetation and the factors affecting their survival. Project or study proposals must pertain to native plants of Montana. All proposals that meet the minimum criteria will be considered for up to \$1,500. Proposals that demonstrate initiative and cooperation with others, and those that generate data or public support for conservation of native plants in the wild are preferred. Proposals must be emailed by January 31, 2016. Grant recipients will be required to submit a final report of the study or project accomplishments by January 2017.

Complete eligibility criteria and application instructions are in the "call for proposals" on the MNPS website (http://www.mtnativeplants.org/Small_Grants_Program), or contact the small grants committee chair at bkuropat@centurytel.net.

WELCOME NEW MEMBERS

The Montana Native Plant Society welcomes the following new members:

Calypso Chapter

Kelly Savage and Julie McLaughlin

Clark Fork Chapter

Dorothea Kast, Andrea Stierle and Lucia Young

Flathead Chapter

Noel Drury and Linda Katsuda

Valley of Flowers Chapter

Lesley Orloff, Beverly Fowler and Christine Gauss

Eastern-At-Large

Charles Ernst

Western-At-Large

Lech Naumovich

President's Platform

Best wishes for a happy and fulfilling 2016!

The new year promises to see the continuation of the Montana Native Plant Society's tradition of providing educational and fun native plant activities for Montana's plant enthusiasts. Here is what's happening:



- Our six Chapters and our Eastern and Western At-Large members host lectures, herbarium nights, hands-on workshops and get-togethers throughout the year. Becoming an MNPS member assures that you will receive information on the activities as they become available.
- The MNPS Small Grants Committee offers four grants of up to \$1,500 each for projects that stimulate research, conservation and educational activities that help foster an appreciation for Montana's native plants and plant communities. Proposals are currently being accepted. See the article included in this newsletter for more information.
- The bi-annual Conservation Conference to be held February 9-10 at the University of Montana will focus on how genetics contributes to plant conservation.
- The MNPS Annual meeting will be held June 24-26 at Fairmont Hot Springs in conjunction with the American Penstemon Society. We are expecting at least 200 people at that meeting. Look for information on our website at www.mtnativeplants.org.
- Throughout the summer look for field trips in your area and share beautiful vistas, great hikes and educational botanizing. Field trips are a wonderful opportunity to make new acquaintances and renew old friendships. A field trip guide will be included in your summer issue of Kelsey.
- The Landscape and Conservation Committees are continually working to involve members in efforts to promote Montana's native plants and plant communities.
- Ad hoc committees such as the Marketing Committee are taking on projects to improve our visibility and accessibility to the public.

If you would like to be more involved, there are a number of opportunities! Contact me or your chapter president for more information. We're looking forward to a great 2016!

— Kathy Settevendemie



two types of gametes or sex cells. Numerous flagellated sperm are produced in a specialized structure called an antheridium found below the surface of the gametophyte, while an egg is formed in a flask-shaped structure called an archegonium. Sperm swim in a film of water from the antheridium of one gametophyte to the archegonium of another, where one will fuse with the egg cell to form a diploid zygote (restoring the original chromosome number). The zygote is initially nourished by the gametophyte but eventually outgrows its parent and develops into a mature sporophyte—the phase of the life cycle that we recognize as a typical fern. Sporophytes produce spores, to begin the life cycle anew. The complex life cycle of the fern is called an “alternation of generations” because the gametophyte phase alternates with the sporo-phyte phase.

4 Ferns can only grow in habitats where the gametophyte phase can survive.

We tend to think of ferns as delicate plants that can only grow in wet, shady sites. Like some stereotypes, this is partially based on fact. The requirement of a thin layer of water for sperm to swim from one gametophyte to another for reproduction severely limits the diversity of sites where gametophytes can occur. Since the sporophyte generation matures out of the fertilized embryo in the archegonium, fern plants can only be found in the same sites as the gametophyte phase. Water is not a limiting factor in many tropical habitats or cool, shaded canyons, where many ferns grow. Some ferns are able to grow in hot, sunny, desert environments, but typically only from cracks in bedrock. The cracks provide a shady site where spores can germinate and enough moisture gets trapped in the cracks to allow for fertilization.

5 Those little brown spots on the underside of fern leaves are not bug eggs or a disease but actually their reproductive parts.

Technically, the dots are called sori (singular = sorus) and consist of clusters of spore-bearing sporangia. Without the sporangia, the sporophyte would not be able to produce the spores that give rise to the gametophyte generation. Thus, there is no need to help a fern by scraping the sori off or dipping them in insecticide. In many ferns, each sorus is partially covered by a membranous flap of tissue called an indusium, or protected by the inrolled margins of the leaflet. The shape and position of indusia is a useful characteristic for identifying fern species to genus.



Male fern (*Dryopteris filix-mas*)

6 Ferns invented the catapult.

The sporangia of most ferns are borne on a short stalk and have a prominent ridge of partially thickened cells called an annulus. Under magnification, the annulus looks like the segmented body of a worm or arthropod. The annulus functions much like a medieval catapult in the forcible ejection of spores. As the sporangium matures it begins to lose moisture, causing the outer cells walls to be sucked inward and the thickened annulus to contract. Eventually, the sporangium is torn at a weak point and the thick annulus becomes pulled backward like the cup of a catapult. As water is continually lost, the annulus comes under tremendous tension (about 300 atmospheres of pressure). When the tension is finally broken, the annulus snaps back to its original shape and in the process flings the spores out into the air, where they may be caught in the wind and moved a far distance from the parent plant. On dry, windy days you can watch the sporangia of a fern begin to recoil, though the actual release of the spores is too fast for the human eye to detect. (There are several videos on Youtube where you can see this in slow motion.)

7 Fern spores are capable of extremely long-range dispersal.

Spores usually land relatively close to their parent plant, which makes some sense since they require similar environmental conditions in order to germinate. In rare cases, however, spores can travel 500 miles or more if they are lofted into the upper atmosphere by strong winds. Recent experiments have shown that fern spores remained viable after being adhered to the wings of commercial aircraft and exposed to high UV radiation and other extreme conditions above 30,000 feet. Ferns are often common on remote islands, suggesting that they are not limited by dispersal barriers. The black spleenwort (*Asplenium adiantum-nigrum*) occurs primarily in Eurasia and Africa, but widely disjunct populations are also found in shady canyons in northern Mexico, Arizona, Colorado and Utah’s Zion National Park. Although sometimes considered a separate species, the North American populations are indistinguishable from those of the Old World. This species is



Black spleenwort (*Asplenium adiantum-nigrum*) occurs widely in Europe, Asia and Africa, and in a few isolated sites in western North America, including a few shady canyons and grottos in Zion National Park. Its spores are thought to have reached North America naturally via strong, high-atmosphere winds. Illustration by Kaye Thorne.

Illustration contributed by: www.plantillustrations.org

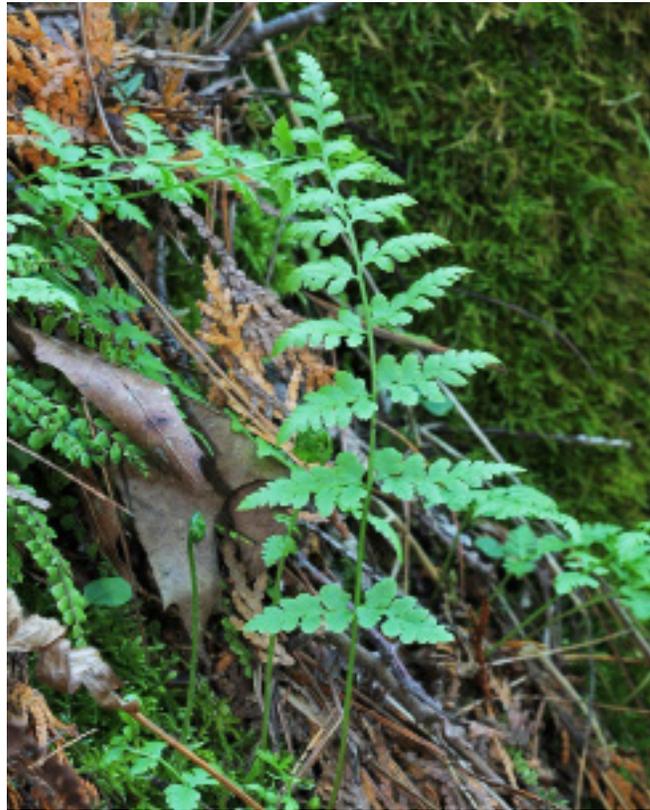
not grown commercially and so the most likely explanation for its unusual geographic distribution pattern is the long-distance dispersal of spores from Asia to North America in the distant past. Bracken fern (*Pteridium aquilinum*) is found on nearly every continent and has one of the largest global distributions of any plant (or animal!). Its ability to spread readily is attributed to strong atmospheric winds blowing its tiny spores.

8 Among vascular plants, ferns are the second only to the flowering plants in total number of species.

Taxonomists recognize at least 12,000 species of ferns worldwide. While this number pales compared to the estimated 300,000-320,000 angiosperms, it is much higher than the 650 or so known gymnosperms. Ferns also greatly outnumber other “fern ally” groups, such as lycophytes (clubmosses). Fern species richness is greatest in the tropical regions of the world. Only 50 species of ferns are known from Montana. Another 28-30 spore-bearing fern allies (*Equisetum*, *Selaginella*, *Lycopodium*, and *Isoetes*) occur in the state. All told, the seedless vascular plants make up just 3% of the native and naturalized flora of Montana. Perhaps the best place in Montana to see ferns is Flathead County and the area around Glacier National Park, which has nearly 80% of all the fern and fern-ally taxa from the Treasure State.

9 Recent molecular studies suggest that horsetails and whisk-ferns are actually ferns rather than separate groups of seedless vascular plants.

Morphologically, horsetails (*Equisetum*) and whisk-ferns (*Psilotum*) bear little resemblance to true ferns. Modern horsetails have minute, scale-like leaves and fluted green stems capped by a cone-like collection of sporangia. Whisk-ferns (a



Brittle bladder fern (*Cystopteris fragilis*)

common greenhouse weed) are even stranger in appearance—resembling branched twigs—and are both leafless and rootless. Whisk-ferns are often thought to resemble the earliest known vascular plants (called rhyniophytes) that first colonized dry land in the late Silurian Period nearly 430 million years ago. Molecular studies now place *Equisetum* squarely within the true ferns alongside the tropical Marattiales. *Psilotum* also appears to share genetic traits with the grapeferns and moonworts (Ophioglossales). Its primitive characters are thought to be a modern adaptation to being epiphytic. The placement of the horsetails within the ferns remains controversial, however, as it is not well supported by the fossil record (ancient, tree-like horsetails were common in the coal swamps of the Carboniferous Era, 325-345 million years ago).

10 Aquatic ferns once were dominant in the Arctic Ocean and may have triggered global cooling that preceded the Ice Age.

While most ferns live on land, several species have become adapted to living in fresh water. One such group is the genus *Azolla*, also known as the mosquito fern. Today, mosquito ferns are widespread in warm areas and are important for fertilizing rice fields (the free-floating ferns have a pouch-like structure among their leaflets that supports nitrogen-fixing blue-green algae). About 10 years ago, researchers were shocked to discover thick beds of fossilized *Azolla* and its spores in sediment cores taken from the floor of the Arctic Ocean. The fossils were dated to 50 million years ago when the Arctic was ice-free and the entire planet was significantly hotter than today. Some geologists now suspect that the straits connecting the Arctic Ocean to other oceans were closed off at this time, allowing freshwater running off the surrounding continents to cover the surface. The freshwater and warm climate were hospitable for *Azolla*, and in fact the Arctic Ocean literally may have been a carpet of these plants. As *Azolla* plants died, they would sink and carry their reserves of carbon produced from photosynthesis to the oxygen-depleted ocean floor, allowing thick beds to accumulate. This natural sequestration of carbon may have helped reduce the level of CO₂ in the atmosphere and initiated a period of cooling. By 47 million years ago the Arctic Ocean had become frozen, as it has remained mostly to this day. Could tiny *Azolla* help bind carbon dioxide today and help reduce the impacts of climate change? 🌱



Field horsetail (*Equisetum arvense*)



Tapping the Norway Maple

By Jenny Tollefson, Clark Fork Chapter

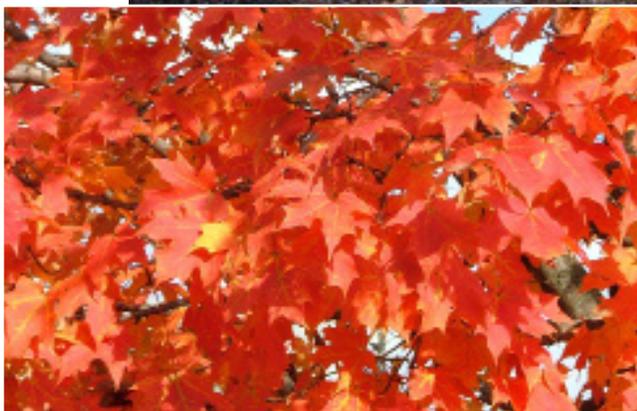
[Reprinted with permission from the Spring/Summer 2012 issue of *Montana Naturalist*.]

Will detours past our Norway maple tree on the way to the school bus this late-winter morning. Mouth open wide, he positions his head under the metal spout and collects the drops of sap that sluggishly emerge from the tap – one, two, three, four . . . “Let’s go!” I call out from the sidewalk as the bus rounds the corner. “The sap will be flowing after school!”

Real maple syrup is not part of my heritage. As a kid, only Western Family brand maple-flavored syrup ever graced our pancakes and waffles. It wasn’t until I fell in love and moved to Vermont that I experienced maple culture first-hand. Our backyard woods were crisscrossed with a maze of plastic tubing connecting the sugar maple trees. Buckets of sap were transported to the sugar shack by horses where family members worked around the clock tending the fire and the sap evaporator. On a late-winter day each year, we would ski, hike, or



Tapping maples in New Hampshire



Sugar Maple (*Acer saccharum* Marshall)

slosh through the mud to the sugar shack deep in the woods, smelling the syrup from a mile away, and feast on pancakes with fresh, hot maple syrup. Needless to say, when we moved back to Missoula to raise our family, we kissed Western Family goodbye and made room in our grocery budget for real maple syrup.

Some years ago I met Bob Hayes, who operates a small ranch on Evaro Hill just northwest of Missoula. On the day I met Bob, he offered me a spoonful of maple syrup he had just made from the sugar maple tree (*Acer saccharum*) outside his front door.

Bob grew up in Vermont and, when he moved to Evaro Hill, he planted this tree from his home state to provide shade in the summer, glorious foliage in the fall, and sweet syrup in the spring. As we savored that pure, amber syrup we got to talking about tapping trees, and the various species of the genus *Acer* that are suitable for the job. I told him about the Norway maple (*Acer platanoides*) in my backyard and, although he’d never heard of anyone tapping a Norway maple, he sent me home with some reading material: a small booklet by an old Vermonter, Noel Perrin, called “Making Maple Syrup.”

Native to continental Europe and western Asia, Norway maples were first introduced to the eastern United States in the mid- to late-1700s. It was Missoula’s co-founder Frank Worden who reportedly imported the first Norway maples from his home state of Vermont and planted them outside his Pine Street

home. As it turns out, Norway maple thrives here in Missoula. While it has done an excellent job of providing deep, cool shade to generations of Missoulians, it has also spread like a weed, each tree producing an abundance of winged seeds that fly on the wind like tiny helicopters and manage to germinate in every nook and cranny.

That first year my kids and I cautiously drilled two holes in our Norway maple, tapped in the spouts, and rigged up some yogurt containers to catch the sap. We diligently harvested the sap, but had a little trouble with our processing methods. The first batch burned and nearly ruined our pot. We accidentally knocked over the second batch. The final batch was cooked just a little too long and turned into rock-hard maple sugar candy that my kids loved, but we definitely could not pour on pancakes.

This year, by comparison, has been great. As I obsessively check the pot, adding more sap and watching the steam rise into the slate late-winter sky, I feel like a new mother fussing over her baby. We've managed to produce almost a full quart of delicious, golden-amber, intensely-sweet syrup – our urban agricultural experiment has succeeded at last.

Still, there is no forgetting the aggressive, dark side of Norway maples. In a few weeks I will be furiously cleaning Norway maple seedlings out of my gutters and yanking the Norway maples that are threatening to take



Norway Maple (*Acer platanoides*)

Since Frank Worden's time, Norway maple has spread from our boulevards and yards into our city's natural areas. In Greenough Park—forty-two acres of open space along Rattlesnake Creek just north of downtown Missoula—the native cottonwood forest that once shaded the riparian zone along the creek has been invaded by, and in some places taken over by, Norway maples. Some portions of Greenough Park are undergoing active restoration, which has entailed cutting down all the Norway maples to allow for regeneration of native species. Much of the northeast corner of Greenough remains, for now, a Norway maple monoculture, devoid of any understory vegetation other than young Norway maples. It is a deep, dark, mysterious place.

My kids have dubbed this patch of forest "Tiger Woods" (for the wild animals that surely lurk there, not for the golfer). Tiger Woods is a great place to explore, but from an ecological perspective, it doesn't have much to recommend it.



With its invasive growth habits, Norway maple can become a problem, especially in riparian areas.

over my vegetable garden. My neighbor, in her sweetly sinister way that I love so much, suggested we take our syrup operation to the extreme. Instead of carefully limiting the number and placement of taps each year to minimize impacts to the tree, we should tap our Norway maples to death. Then we could get on with the business of restoring the glorious riparian cottonwood forest that thrived here before the Norway maple invasion. We would have a great sap harvest that last year. Just think of all the syrup! 🌸

Jenny Tollefsen is co-treasurer of MNPS and Stewardship Manager with Five Valleys Land Trust. She and her family live in the Rattlesnake Valley, not far from Tiger Woods.

Opposite page, top: Author's son checking bucket. Here, the finished product!

A few months after my visit with Bob Hayes, a small package from him arrived in the mail containing two shiny aluminum maple taps.





Book Corner

PONDEROSA: People, Fire, and the West's Most Iconic Tree.

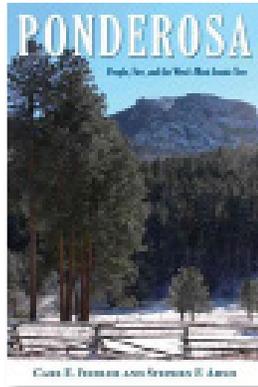
By Fiedler, Carl E. and Stephen F. Arno.

2015. Mountain Press Pub. Co., Missoula, MT.

248 pp. (Paperback, 6" x 9").

[ISBN: 978-087842-638-6]

\$20.00 + shipping.



Review by Daniel Tinker, Dept. of Botany, University of Wyoming

[Reprinted with permission from the December issue of *Castellija*, the newsletter of the Wyoming Native Plant Society.]

In their book, "Ponderosa: People, Fire, and the West's Most Iconic Tree," Carl Fiedler and Stephen Arno have given readers an informative and entertaining collection of essays and photographs that focus on Ponderosa pine (*Pinus ponderosa*), certainly a favorite tree of residents and visitors alike. The book is part ecological primer, part historical account and part tour guide, and excels in all three areas. It is organized into two main sections: Part I contains the majority of the life history and ecological chapters, while Part II serves as a traveler's guide to unique and beautiful Ponderosa pine locations throughout the 16 U.S. states of its distribution, as well as British Columbia, Canada. The book is loaded with sound science throughout, but presented in a very readable way for non-scientists. Plus, the excellent collection of historic and current photos really makes this an excellent read.

Fiedler and Arno's approach in Part I takes the reader through the century-long transformation from historical Ponderosa forests of the 1800s to the "modern" forests of today. They begin with an enlightening treatment of the role of ponderosa pine in U.S. history, including the often intimate relationships with Native American Indians, providing evidence of their use of ponderosa as a building material as early as AD 500. Many of the accounts are anecdotal, but still paint a fascinating picture of the many uses of the tree by the wide range of historical inhabitants of the Western U.S., including the early pioneers and the U.S. military. The authors do a really nice job with their descriptions of the life history characteristics of Ponderosa, from its broad genetic diversity and geographic distribution, to its adaptations to drought and fire.

And, speaking of fire, Fiedler and Arno dedicate three chapters to Ponderosa's "multifaceted relationship with and dependency on fire," highlighting the evolution of attitudes and management philosophies regarding fire and its near-elimination from most Ponderosa forests in the West. They also emphasize the importance of Ponderosa in the forest products industry, tracing the harvesting of old-growth forests via "clearfelling" and "high grading" to the more familiar clearcuts of the 1960s and 1970s. They include a nice section that highlights the

emerging environmental legislation that arose following the cessation of clearcutting in Ponderosa pine forests and how, while well-intentioned, these policies actually created provisions for completely eliminating fire from these forests.

As the authors move into the more recent "modern" forests, they describe how humans are "loving our forests to death," particularly with the increase in housing development in the wildland-urban interface (WUI), much of which occurs in and around Ponderosa pine forests. They wrap up Part I of the book with a brief, yet grim reminder of the recent spate of "megafires" that have burned in Ponderosa forests beginning in the 1980s, along with the acceleration of other major disturbances such as bark beetle epidemics. The final chapter focuses on what we have learned through scientific research over the past few decades, and describes the various approaches and challenges to actively restoring Ponderosa pine forests.

Part II, as mentioned before, is a travelogue for Ponderosa pine seekers around the Western U.S. and British Columbia. This section is yet another reason to throw this book in your backpack while you're traveling if you're a lover of Ponderosa. From Arizona to North Dakota, they describe literally dozens of "special" sites across the region. Here in Wyoming, they highlight four such places: Blacks Fork River, southwest of Mountain View; Vedauwoo recreation area in the Medicine Bow National Forest; Mallo Camp, in the Black Hills; and the land around the Pine Bluffs Rest Area, east of Cheyenne. If you haven't seen these special places, you should check them out as soon as you can. And, if you want to learn more about Ponderosa pine and have a great read at the same time, I'd suggest a copy of this book for your collection!

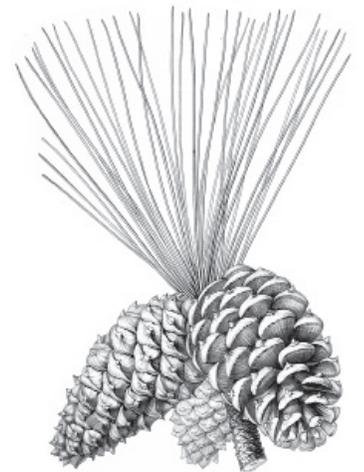


Illustration contributed by: Missouri Botanical Garden, St. Louis, U.S.A.

What Should We Call It?

Submitted by Peter Lesica, Clark Fork Chapter

MNPS and more than a dozen authors are well on their way to producing a book on the early botanical exploration of our state. Now we need a catchy title. Here's what we have so far:

Big Sky Botanists, Montana's Early Plant Collectors

Plant Hunters of the Mountains and Prairies, stories of Montana Botanists

Green Bounty, stories of Montana Botanists

Maybe you have a better idea; if so, email it to lesica.peter@gmail.com. If we use your idea, you'll get a free copy of the book!

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

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

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Membership Level	Dues with affiliation*	Dues without affiliation*	Number of years (option to pay ahead)	Donation**	Total amount enclosed
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Family	\$25	\$20			
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Living Lightly	\$15	\$15			
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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 typed, saved in Microsoft Word or rich text format (rtf), and sent electronically to: carokurtz@gmail.com or mailed to *Kelsey* Editor, 645 Beverly Avenue, Missoula, MT, 59801.

Changes of address, inquiries about membership, and general correspondence 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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