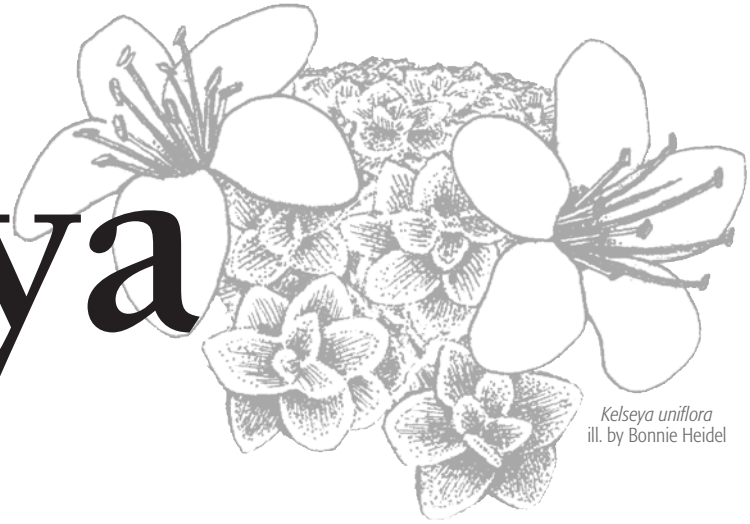
Volume 31 No. 2 | **Winter 2018**

# Kelseya

Newsletter of the Montana Native Plant Society



*Kelseya uniflora*
ill. by Bonnie Heidel

# Dyeing with Native Plants

## CALYPSO CHAPTER WORKSHOP

*By Jesse Salix, Forest Botanist, Beaverhead-Deerlodge National Forest*

Extracting color from native plants is not a new skill, but these days we often stumble upon old techniques via our new technologies.

For instance, I first learned about dyeing with native plants from a podcast, "Growing Color," in which native dye expert Rebecca Burgess described the process of dyeing yarn with native plants. I didn't know how to knit, but the thought of using native plants to make beautiful colored yarn was way too exciting to let that stop me.

So I bought Burgess's book "Harvesting Color." It's pages are filled with the history of dyes and dyeing, color photos of plants, dyed yarn, and excellent step by step recipes. From there I began making color from Montana's native plants: sagebrush, rabbit brush, goldenrod, wolf lichen, Douglas-fir bark, chokecherry, and elderberry. And when I visited my folks in Michigan, I made dye from pokeberry, sumac, and black walnut. I also enrolled my daughter and myself in a knitting class at our local yarn shop in Dillon, so that we could put these beautiful colors into form. But as you all know, knitting takes time!

So when my co-worker, Aleta Lavender, mentioned dyeing silk scarves, and after we spent a day experimenting, I was hooked. In October 2016, we held our first "Dyeing with Native Plants Workshop." We discovered that there is a lot of interest the fiber arts! Folks from Butte, Polaris, Philipsburg, and Dillon attended. We had several fine wool workers come who brought several varieties of yarn and roving to dye. The silk scarves were a hit, and Catherine Cain had the forethought to bring rubber bands for the tie-dye effect, which added great contrast and character.

At the October 2017 workshop, we raised the bar by adding batik technique to the dyeing experience, *continued on page 3*

Native plants can produce a beautiful array of soft colors for yarn projects..
*Photo courtesy of Jessie Salix.*

*Happy New Year 2018*

**MONTANA NATIVE PLANT ENTHUSIASTS!**

# Chapter Events

## Calypso Chapter

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

## Clark Fork Chapter

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

**Monday, January 8, 7:00 p.m.** Come hear Forest Service ecologist Bob Keane talk about "Best Friends Forever: The Importance of the Mutualistic Relationship of Whitebark Pine and Clark's Nutcracker in an Uncertain Climate Future." This is a joint meeting with Montana Audubon, Room 123, Gallagher Business Bldg., UM Campus.

**Tuesday, January 30, 7:00 p.m.** Herbarium Night. "Let's Look at Our Buckwheats." Eriogonum is North America's second largest endemic genus. Find out more about them with Peter Lesica. Room 303, Botany Bldg., UM Campus.

**Thursday, February 8, 7:00 p.m.** Jim Romo grew up in northeast Montana and taught at the University of Saskatchewan for several decades. Now he's in Missoula to tell us about "The Prairies of Saskatchewan and their Flora." Room L09, Gallagher Business Bldg., UM Campus.

**Thursday, March 15, 7:00 p.m.** Indigenous peoples were our first botanists. David Hooper spent many years studying the "Cultural and Ecological Relationships between the Nisqually Indian Tribe and Plants of Mount Rainer" for his PhD. Join us in Room L09, Gallagher Business Bldg., UM Campus. (Note different Thursday date.)

## SAVE THE DATE

**The 2018 Montana Native Plant Society Annual Membership Meeting will be hosted by the Clark Fork Chapter June 29-July 1 at Cane Ridge West Conference Center west of Lincoln. Watch for details at www.mtnativeplants.org and in the spring issue of Kelseya.**

## *Don't Be Left Out!*

*It's time to renew — or start! — your membership with the Montana Native Plant Society. Don't lose any issues of our Kelseya newsletter, or miss out on upcoming talks, workshops, conferences or field trips. See Page 11 for complete details, or go to www.mtnativeplants.org. Do it today!*

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

## Eastern At-Large

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

## Flathead Chapter

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

*Meetings are held at the North Valley Community Hall (also North Valley Physical Therapy), 235 Nucleus Ave., Columbia Falls. Join the Chapter's board/planning meetings at 5:30 before the program. Note some changes from our regular 3rd Wednesday of the month meetings. To receive updated information, please email mnps.flathead@gmail.com to be added to the mailing list or to inquire about programs.*

**Thursday, February 15, 7:00 p.m.** "Hometown Habitat: Stories of Bringing Nature Home." Join us for a screening of this new video illustrating how the use of native plants in landscaping is revitalizing ecosystems across the country. To be followed by a discussion about the film and native plant gardening in the Flathead. (Note change of day and week to accommodate the Plant Conservation Conference, Feb. 21-22, Helena.)

**Wednesday, March 21, 7:00 p.m.** "Grass Identification Workshop." Glacier National Park botanist Jen Asebrook will help us learn our grasses. Bring a hand lens and plant keys if you have them.

**Thursday, April 19, 6:00 p.m.** "Native Plant Trivia Night." Grab some friends, eat good food and put on your thinking cap! Backslope Brewing, 1107 9th St. W (Hwy 2), Columbia Falls. (Note different day and location.)

**Wednesday, May 16.** "Field Trip." Time, place and topic TBA.

## Kelsey Chapter

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

**Tuesday, February 20, 7:00 p.m.** "Montana Wild." The Montana Native Plant Society recently published a collection of biographical sketches of botanists who first explored Montana's native plants, and "Montana's Pioneer Botanists: Exploring the Mountains and Prairies" is destined to become a classic in this field. Columbia Falls resident and MNPS Board Secretary, Rachel Potter, who co-edited the work along with Peter Lesica, will share choice vignettes from the book, as well as interesting things that happened while creating this unique project with 19 authors and 32 artists and photographers. For book reviews and more, go to www.mtnativeplants.org and click on the link to the book.

**February and/or March.** Dates and times TBA. Chapter member and botanical artist Jane Fournier will present a two-part program on botanical illustration. The first part will be a review of the art of botanical illustration. The second program will be a hands-on opportunity to learn some of the skills and practice the art. Lewis and Clark Library, Large Meeting Room. Details will be posted on www.mtnativeplants.org, Kelsey Chapter page, when they are set.

## Maka Flora Chapter

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

## Valley of Flowers Chapter

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

*Chapter lectures or workshops are held on the second Tuesday of the month, September through April, at 7:00 p.m. in Room 108, Plant Bioscience Building, MSU, unless otherwise indicated.*

**Tuesday, January 23, 7:00 p.m.** "Lichen Workshop" with Andrea Pipp, Montana Natural Heritage Program botanist. Meet in Lewis Hall, Room 307.

**Tuesday, February 13, 7:00 p.m.** "Re-imagining the Lawn: Looking at New Ways to Cover Ground." Linda Iverson will give us a virtual tour of area landscapes she created using diverse plantings of native grass, wildflowers and shrubs to provide an alternative to monoculture lawn grass.

**Tuesday, March 13, 7:00 p.m.** "Sedge and Rush Workshop" with Matt Lavin, MSU Herbarium director/curator and ecologist.

**Tuesday, April, date and time TBA.**
Kathryn Kelly, Montana Land Reliance.

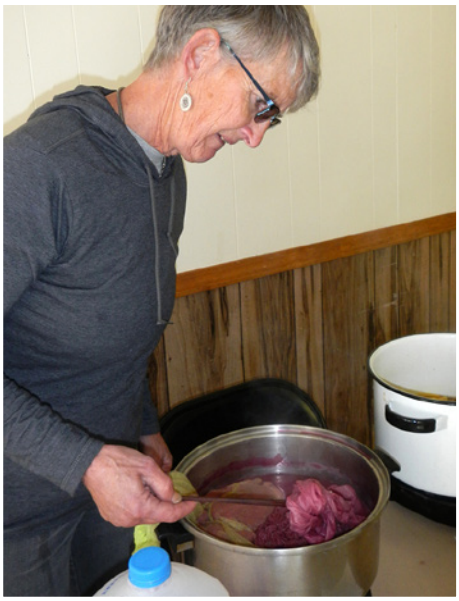
**Sunday, April 22, 10:00 a.m.** Earth Day. Kagy Blvd. Knapweed Pull and Pollinator Garden Cleanup. Help pull knapweed and tour the restoration of native plants along the roadcut, then help with the spring cleanup off the Native Pollinator Garden along the Gallagator Trail. Bring gloves. Meet along Kagy between Sourdough and Highland Blvd., Bozeman.

## Western At-Large

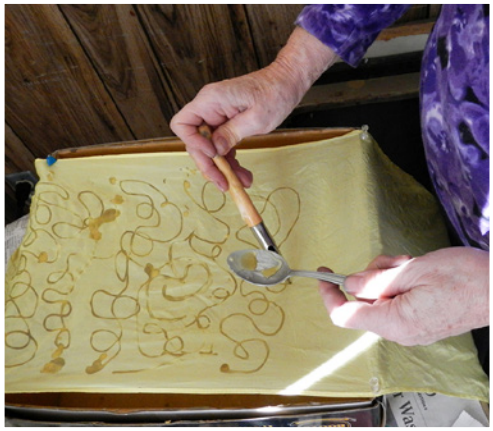
*Info: Pat McLeod at 295-4343, pat_mcleod@yahoo.com.*

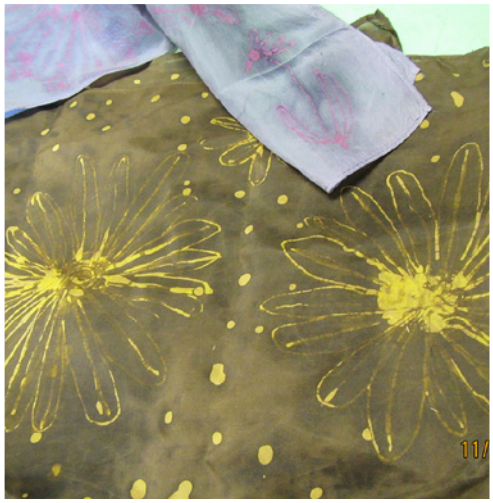
*continued from page 1*

using bees wax resist dispensed in traditional batik tools (tjantings). To get a two-colored scarf, the scarves were first dyed in a light under-color. After about a half hour in the under-color dye bath, the scarf was dried, then rinsed, and then dried again. After which time the resist (hot wax) was drawn onto the scarf using the batik method. The most successful contrast color was then produced by dipping the wax drawn scarf into an iron after-bath made of rusty nails, vinegar and water. The iron after-bath produces a dark brown or olive reaction with most native dyes. Scarves dyed in chokecherry or elderberry produced either a blue grey or green color when dipped in an ammonia after-bath. The wax is then picked off, and the scarf ironed between newsprint and paper towels to get the additional wax out of the scarf, or simply dry cleaned after scraping wax.



For the 2018 "Dyeing with Native Plants Workshop," we are hoping to be ready to dye cotton, which requires some additional steps with tannins. We also hope someone will grow us some indigo, so we can create BLUE! And for myself, I just need to up my fashion game so I can wear all of these amazing scarves!





Clockwise from above, a workshop participant steeps yarn in chokecherry dye; using traditional batik methods to create a design on silk fabric; the finished product. *Photos courtesy of Jessie Salix.*

# 2018 Small Grant Proposals Deadline is Near

If you've been thinking about a project that promotes native plant conservation or education, now is the time!

The annual MNPS Small Grants competition is 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 factors affecting their survival. Project or study proposals must pertain to Montana native plants and applicants must address specific criteria and formatting requirements. All proposals that meet the criteria will be considered for a grant 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, 2018. Grant recipients will be required to submit a final report of the study or project accomplishments by January 2019.

Complete eligibility criteria and application instructions are on the MNPS website at www.mtnativeplants.org, or contact committee chair Betty Kuropat, bkuropat@centurytel.net.

## OFFICER NOMINATIONS

### MNPS Wants You!

Consider stepping into a bigger role with MNPS by joining the Board of Directors. It's fun, fulfilling, and involves very reasonable responsibilities. The board meets three times a year, and calling-in to meetings is possible. Board members can be reimbursed for mileage and expenses if desired.

Each year, three of six officers are elected. This year, we will select a Vice President, Secretary, and Eastern At-Large Representative for two-year terms. The nominating committee is accepting nominations until February 15, 2018. Email inquiries or nominations to Betty Kuropat, bkuropat@ centurytel.net, or Gretchen Rupp, beesgrmt@gmail. com.

# President's Platform

It's the deep midwinter in the northern latitudes. Plants are snoozing for a few months and we humans are sorely tempted to do the same. Or to curl up by the woodstove, binge-watch our favorite shows and stuff ourselves with delicious high-calorie leftovers. In the face of this nearly-irresistible urge, I suggest three actions plant enthusiasts can undertake to combat our seasonal torpor.

**First:** get out! It's true there isn't a lot of color in the plant world just now, but even so it's well worth taking the trouble to get on the trail for an afternoon. This morning a friend and I climbed a tiny game trail above Bozeman for a couple of miles. In a melted-off meadow, grass had been cropped short by elk. A scatter of pine branch tips in one spot told of a hungry grouse. Freshly-thrashed tree saplings showed that we were traversing the territory of a buck deer who was active in the rut last fall. Animals depend on plants; we knew that. But it was super-satisfying to sleuth out just what the relationships are in the winter woods.

**Second:** get out! This time I mean, get out to at least a couple of your local MNPS Chapter events. It can be hard to get moving on a cold evening, especially if driving is required, but the rewards outweigh the trouble. First, there's the learning about plants in their natural habitats or in cultivated landscapes — that's guaranteed. You're also likely to meet someone you didn't know, who is totally on fire for the subject of the program. That kind of enthusiasm is a wonderful battery-charger and antidote to the winter blahs. And finally, there's simply the camaraderie with fellow plant pals. I've always found MNPS members to be a welcoming bunch, without snobbery or exclusivity. Folks who are new to the state, or to the organization, are just as valuable as old-timers — maybe more so, since they bring fresh ideas!

**Third** (no surprise here): get out! In your imagination this time. Specifically, think about where you'd like to go on MNPS field trips next summer, and make plans to lead one of those trips. This requires familiarity with a place — its access, distances and slope, potential natural hazards, and general plant communities. It does not require a degree in botany. I'm an engineer and educator by profession and when it comes to the Kingdom Plantae, my sole expertise concerns the cultivation of cold-hardy tomatoes. But I lead a satisfying field trip each year. A group of people who are open to encountering new things, eager to learn from each other, and who bring a variety of references with them cannot help but have a terrific experience in the field. So… Where will we be exploring with YOU this year?

Enjoy the winter, and I look forward to seeing you in the field this summer! Please send your feedback on this essay or any other MNPS matter to me at beesgrmt@gmail.com.

*— Gretchen Rupp*

# Small Grant Report

## Fine-Tuning Native Plant Community Restoration at Weedy Sites

*By Christine McManamen and Cara Nelson,*
*Department of Ecosystem and Conservation Sciences, W.A. Franke College of Forestry and Conservation, University of Montana*

Removing weeds is often necessary in order to restore native vegetation, but this can be a tricky and costly endeavor. Oftentimes, people treat weedy species with herbicide and then follow up by seeding native species. But how do herbicide treatments actually affect germination and the establishment of seeded native plants, and how long you should wait after spraying to seed?

Study pots at the UM-managed greenhouse at Fort Missoula. *Photo by Christine McManamen*

Surprisingly little information is available on this subject. Herbicides offer a relatively quick, effective means of reducing weeds; however, the same or new weeds are likely to resurface in herbicide-treated sites if the re-establishment of native plants does not occur fast enough. Seeding with natives can reduce the re-invasion of weeds and lead to a better chance of establishing native plants, but because many herbicides can remain active in soil long past an initial treatment native seeds may be harmed or fail to survive when sown onto herbicide-treated soil.

Guidance on the timing of herbicide applications and seed additions for successful restoration projects is somewhat lacking. For instance, the instruction labels for many commonly used synthetic auxin herbicides (growth-regulating chemicals) are not particularly useful for people who want to seed native plants after treating weeds in a natural area. The label for Milestone®, one of the top ten most commonly used herbicides in natural areas management, recommends waiting only 90 days after summer spraying before seeding forbs, suggesting that all forb species will respond similarly to being seeded in herbicide-treated soil at any site. To improve the success and cost-effectiveness of native plant community restoration, we need to know more about how the seeds of different native species respond to different timing of herbicide application in coordination with seed additions, and the extent to which results might vary by soil type.

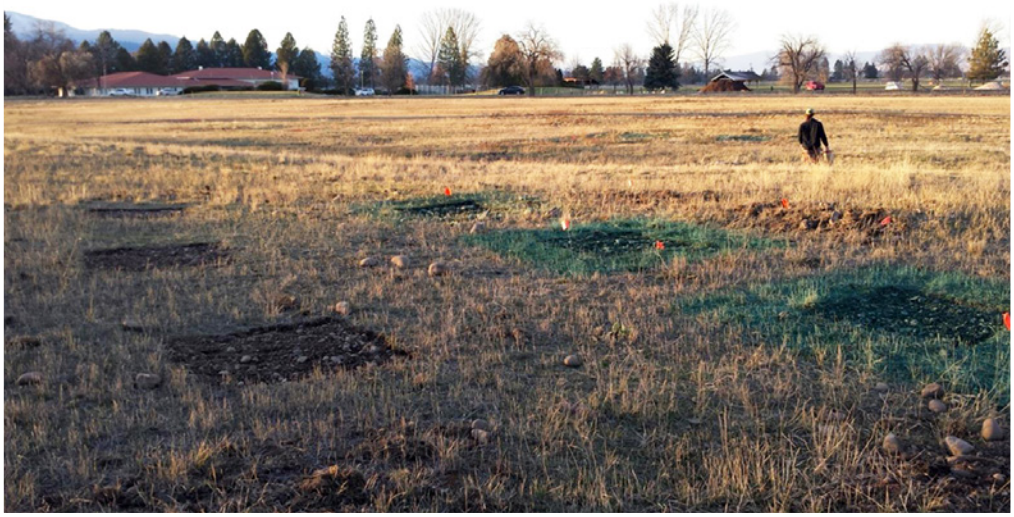
The Ecological Restoration Lab at the University of Montana has been conducting experiments related to the efficacy of herbicide-use and reseeding for native plant community restoration. The lab has found strong evidence that herbicides applied immediately before seeding reduce both germination rates and seedling size of native forbs and grasses (results published in *Restoration Ecology*, Wagner and Nelson 2014). Most species had nearly a 100% decline in germination. When we separated the timing of herbicide treatments and seed additions by up to 47 days, we found that the negative effects of herbicides declined over time for some native forbs and grasses, while for other species there was virtually no decay over time in herbicide effect on either rate of germination or seedling size (unpublished results, McManamen and Nelson). These results led us to set up additional experiments to address the following questions:

**1.** Do the duration and magnitude of the effects of herbicides on seeded native plants vary by species and, if so, what are the implications for developing seed mixes for sites that require chemical control of weeds?

**2.** What is the best time to seed after spraying in order to minimize adverse effects of herbicides on native seed and maximize the benefits of seeding?

We split our investigation into a greenhouse study and a field study. For both parts, we tested native plant responses to the widely used herbicide active ingredients aminopyralid (chemical

formulation: Milestone®) and picloram (chemical formulation: Tordon 22K®), both of which are synthetic auxins. We chose 10 native species commonly used for restoration in the western U.S. for both greenhouse and field experiments: *Artemisia frigida* (fringe sage), *Boechera holboellii* (Holboell's rockcress), *Cerastium arvense* (field chickweed), *Erigeron compositus* (cutleaf daisy), *Penstemon procerus* (litteflower penstemon), *Gaillardia aristata* (blanketflower), *Clarkia pulchella* (deerhorn clarkia), *Koeleria macrantha* (prairie junegrass), *Pseudoroegneria spicata* (bluebunch wheatgrass), and *Festuca idahoensis* (Idaho fescue).



One group of field experiment plots just after receiving the fall herbicide treatment.

In the year-long experiment at UM's greenhouse at Fort Missoula, we altered the timing of seeding relative to the timing of aminopyralid, picloram, and water control treatments to explore both immediate effects as well as the duration of effects of these chemicals on the rate of germination and seedling size. We treated pots with herbicides at five different times during 2015 and 2016: in May (11 months before seeding), in July (9 months before seeding), in October (6 months before seeding), in January (3 months before seeding) and in April (immediately before seeding). At each time, we treated 360 pots with 120 each given one of the following three treatments: aminopyralid, picloram, or water control. Treated pots were stored in the greenhouse, watered two to three times a week, and randomized many times throughout the experiment. In April 2016, after treating the final set of pots, each one was seeded with 50 seeds of one of the 10 native study species. We replicated each chemical treatment/timeperiod/species combination 12 times for a total of 1,800 pots in the greenhouse. After a six-week germination and growing period, we recorded the number of live germinates in each pot and collected, dried and weighed above-ground biomass.

***"...benefits of seeding natives may not be realized if seeding occurs too soon after herbicide application..."***

Over the same year period, we conducted a field test of herbicide effects on native plant germination at a flat grassland site managed by Missoula Parks & Recreation at Fort Missoula. In October 2015, we set up 72 one-meter-square plots at the field site. Plots were initially cleared of vegetation and non-study species were routinely removed from plots throughout the field experiment. During that fall, we sprayed half of the plots (including a two meter buffer around each plot) with one of the same three treatments (aminopyralid, picloram, or water control). In the spring of 2016, we treated the remaining plots and seeded a mix of the native seeds (100 seeds per species) onto each plot. Seeds were patted into the ground by hand to improve their contact with the soil surface. After 7 weeks, we recorded the number of germinates and seedling size for all study species in the plots. Due to low germination in control plots, results for only four of the 10 species seeded onto field plots *(P. spicata, G. aristata, A. frigida, and B. Holboellii)* were analyzed.

In the greenhouse experiments we found that nine of 10 study species germinated at significantly lower rates in herbicide-treated pots relative to the control for both herbicide active ingredients at all time periods (Figure 1). The one species that differed from this trend was *F. idahoensis*, which responded to picloram treatments in the same way as other species (significantly lower germination than in controls throughout the study period), but no significant difference from controls at the 11-month time period. Individual grass species varied in germination rate among time periods. For instance, in aminopyralid-treated pots, *K. macrantha* had nearly 100% reduction in germination at the three, six and nine month time periods, but only 52 and 59% fewer seedlings at the zero and 11 month time periods, respectively. In picloram treated pots, *K. macrantha* had 89-100% fewer seedlings across all time periods. In aminopyralid-treated pots, *P. spicata* ranged from 7- 99%

fewer seedlings compared to controls, depending on time period, while in picloram-treated pots it ranged from 55-96% fewer seedlings. In contrast to the observed among-species variability in germination rate, all grass species had significantly lower seedling size at all treatment x timing combinations

Of the seven forb species, four *(E. compositus, P. penstemon, C. arvense, and A. frigida)* had nearly 100% reduction in germination and biomass compared to the controls, regardless of the time period between treatment and seed addition or type of herbicide. Two other forbs, *G. aristata* and *B. holboellii*, followed a similar pattern for the first four time periods (up through nine months), but at the 11-month time period there were smaller differences in number of germinants and biomass compared to control groups. *C. pulchella*, the only annual forb studied, did not germinate in aminopyralid-treated pots at any time period and only germinated in picloram-treated pots at the 11-month time period. However, at the 11-month time period it exhibited greater rates of germination than the control (9% more seedlings).

In our field experiment, we found that in spring-treated plots three of the four species tested had significantly lower germination rates and smaller seedlings in plots treated with either herbicide than in untreated control plots (Figure 2). On the other hand, in the fall-treated plots, there was no significant effect of herbicides on rates of germination or seedling size for three of four species. The one species that differed from the other three in both spring and fall was *P. spicata.*

Given widespread use of herbicides and reseeding to control invasive plants in areas where restoration is a goal, it is important to understand the impact of herbicides on native species at the seed stage. Our results suggest that the benefits of seeding native plants may not be realized if the seeding occurs too soon after herbicide application. To improve the efficacy of native plant community restoration, managers should consider how the timing of herbicide applications may impact the re-establishment and continued existence of native vegetation and plan control of invasive species accordingly. Delaying addition of particularly herbicide-sensitive species after applying aminopyralid or picloram, especially in cases where the potential for the return of weedy species is low, may improve native species revegetation. Additionally, in areas where spraying is scheduled, managers could select species for seeding that exhibit lower sensitivity to herbicide-treated soil. Of the ten species we studied, *P. spicata, B. holboellii* and *G. aristata* seemed to have greater tolerance to herbicide exposure at our field site and might make good additions to seed mixes for similar sites that require herbicide treatment.

The variation that we observed between the greenhouse and field study suggest that greenhouse trials may provide managers with information on the maximum potential impact of herbicides (in this case, aminopyralid and picloram) on germination and seedling growth, but that field trials may be the only way to accurately determine the likely impact of different herbicides on specific species at native plant restoration project sites. The success of seed additions after herbicide treatments will vary

Zoomed in image of native germinants *(Boechera holboellii, Artemisia frigida,* and *Gaillardia aristata)* in a field plot sprayed with aminopyralid. *Photos by Christine McManamen*

based on more than just herbicide application rate and species; soil type and field conditions clearly play a large role in the required time between spraying and seeding. The complicated nature of the interaction suggests that managers concerned about herbicide impacts to seed additions for native plant restoration will need to examine species-specific responses to local site conditions and management choices through field bioassays.

We are grateful to the Montana Native Plant Society for providing funding for this research. Funds were also provided by Missoula County Weed District and the Society for Ecological Restoration-Northwest. Missoula Parks and Recreation donated seed and access to the field study site. Thanks to Marilyn Marler and Morgan Valliant for the logistical support and advice.

# New Books

**Intermountain Flora Volume 7:** Potpourri: Keys, History, Authors, Artists, Collectors, Beardtongues, Glossary, Indices. 2017.

Noel H. Holmgren and Patricia K. Holmgren, authors. The New York Botanical Garden Press. 303 pages. Hardcover. ISBN:978-0-89327-546-4.

*Book Review by Matt Lavin*

## Volume 7 of the Intermountain Flora

(IMF) is the final volume of what I consider a quintessential high-quality flora. This last volume details the mechanics of producing a flora for a large region of western North America, over a long time span, 1931-2017, and by diverse group of plant collectors, botanical illustrators, and authors. It reflects a large-scale long-term collaborative effort.

***Penstemon albertinus.*** *Photo courtesy Matt Lavin*

Volume 7 begins with dichotomous keys to the vascular plant families of the region. Because the IMF region is bordered by the Sierra Nevada to the west, the Cascades to the northwest, the Rocky Mountains to the north and east, and the Mojave Desert to the south (the inside back cover shows familiar maps delimiting the IMF region), these keys cover 46 pages and 146 vascular plant families. A primary key to 18 family groups separates, for example, the Asteraceae, the monocots, trees in flower, trees in fruit, shrubs in flower and with opposite or whorled leaves, and shrubs in fruit with alternate leaves and/or basal leaves. Couplets requiring only a knowledge of placentation are rare and most traits used in these family keys are friendly to the unaided eye of even the casual botanist. Because of the high degree of plant diversity in the IMF region, I would expect these vascular plant family keys to be useful in many areas of western North America outside the IMF region.

Historians of botanical exploration will find much in Volume 7. Following the taxonomic keys to families, the volume distills information on authorship citations, dates of publication, and publishers. This will be useful to bibliographers and nomenclature specialists given the long time frame over which the principal six volumes were published, 1972-2012. Botanists with big-picture biodiversity interests will find, for example, that the IMF region harbors an estimated 898 genera, 3,847 species, 1,571 varieties, and 426 cultivated species. In addition, another 551 species range along the border of the region. The founders and leaders of the IMF project, including Bassett Maguire beginning by 1931, Arthur Holmgren by 1943, and Arthur Cronquist by 1959, figure prominently in the chapter devoted to the history of the project. Another chapter on the history of the writing of the Flora brings into focus the work of Noel and Patricia Holmgren, Rupert Barneby, and James Reveal. An additional chapter acknowledges the many plant collectors of the IMF region who contributed in important ways to the floristic knowledge of the region. This chapter highlights the history of Nevada's exceptional plant explorer, Arnold Jerry Tiehm. Tiehm discovered species new-to-science and range-extensions at a rate much greater than most modern botanists. This chapter ensures that Tiehm will be a prominent figure in future histories of botanical exploration in western North America.

***Botanical artists are bound to find this volume compelling.***

Botanical artists are bound to find this volume compelling. Volume 7 devotes a chapter to the works of prominent botanical artists who contributed so profoundly to the high quality of all seven IMF volumes. These artists include most notably Jean Janish and Bobbie Angell. Acknowledged also are the artistic contributions of Rupert Barneby, Marsha Bennett, Robin Brickman, Charles Clare, Haruto Fukuda, Karen Ann Gengle, Molly Coxson Gill, Elaine Hultgren, Robin Jess, Jo Ann Loza, William Moye, Lynn

Reves, John Rumely, Daniela Siroky, Kaye Thorne, Sandra Turico, Laura Vogel, and Gigi Wilson. Indeed, all seven IMF volumes are worth having for the artwork. It is fitting that a chapter is devoted to these important botanical artists who illustrated the entire flora and thus helped make the IMF volumes so invaluable, scientifically and aesthetically.

Penstemon aficionados will find Volume 7 illuminating. A chapter devoted to the genus *Penstemon* provides taxonomic updates to the 1984 IMF Volume 4, Asteridea except Asteraceae. The "artificial" dichotomous keys to all 119 Penstemon species now known from the IMF region cover about 15 pages. These updated keys to species use all the familiar diagnostic traits, including the presence of glands or hairs on the inflorescence, stems, and leaves, and presence and kinds of hairs on the anthers and how the anther sacs split open to release pollen (dehisce). This chapter includes updated species descriptions for those species in which recent discoveries 1) warranted ranking former varieties at the species level, 2) extended the species geographic range into the IMF region, or 3) resulted in species new to science. I find that a quick study of the organization of these Penstemon keys and species descriptions provides a diagnosis for certain of the difficult-to-grasp species. For example, the geographically widespread *Penstemon humilis* is diagnosed, using these keys and descriptions, by short corollas like those of *P. procerus* but that are arranged in loose verticillasters, and by finely hairy stems like those of *P. radicosus* but with leaves produced basally as well as on the stem. Ultimately, the finely hairy stems and leaves of *P. humilis* are what best readily distinguish it from the very similar and more northerly distributed *P. albertinus*.

The final pages of volume 7 include, for example, a detailed geographical circumscription of the IMF region centered on Utah, Nevada and southern Idaho, an extensive glossary, and a cumulative index for all seven volumes of the IMF. The glossary of botanical terms covers 28 pages and something like 1,600 botanical terms. In contrast to the extensive botanical glossary of Wikipedia, the IMF glossary is intended for botanists who already understand basic terms, such as the botanical suffix -aceae. The 64-page index at the very end of the volume covers all scientific and common names, as well as authors and collectors cited in volumes 1-7.

Volume 7 of the IMF will be of interest to those with a deep botanical interest in this area. Because the IMF region harbors much of the western North American sagebrush steppe, anyone interested in the ecology and plant diversity of the sagebrush biome should find this and the other volumes of significant interest. Because of the many isolated mountain ranges in the IMF region, plant biogeographers interested in "sky islands" will find this and the other IMF volumes essential for understanding plant diversity patterns in the region. Perhaps because you live outside the IMF region (e.g., Montana), you have not yet used this or the other volumes of the IMF to learn of the vegetation or plant biogeography of the area, or to identify its plants. However, I recommend you check out the IMF volumes, especially if you have access to them from a friend, through a library, or can afford them (The New York Botanical Garden press offers all seven volumes for $647.00). In Montana, for example, I find that the IMF taxonomic keys and descriptions to vascular plants work well in sagebrush steppe and other rangeland vegetation, which covers much of the state. For comparison, I find the IMF is much more useful than the Flora of the Great Plains for identifying rangeland plant species in Montana. Also, if you have grown tired of taxonomic keys and descriptions that in the end tell you only that two species differ by an arbitrary length of the hairs along the margin of a leaf or of the awn at the tip of the lemma, you will find that the IMF keys and descriptions stand in contrast. They often provide ecological, geographic, and taxonomic insights into how to intuitively grasp the essence of a plant species in question. In my opinion, the IMF volumes set the benchmark for how to best detail and integrate the ecology, geography, taxonomy — and the beauty — of the plant diversity of a region. Volume 7 shows that this requires extensive collaboration directed by a few talented individuals.

*Matt Lavin teaches and conducts research in the fields of plant systematics, biogeography, and biodiversity at Montana State University.*

## HOORAY FOR NEW MEMBERS!

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

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**Kelsey Chapter**
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**Valley of Flowers Chapter**
Renewing lifetime member Jeff Shryer

**Western-At-Large Chapter**
Caroline Kruckeberg-Clemens (Grouse Spring Nursery)

# *Edible Wild Plants*
# Cattail Cuisine

*By Lytton John Musselman, Old Dominion University*

Cattails, species of *Typha* (Typhaceae), are perhaps the most familiar of any marsh plants, recognizable any time of year. The flowers are virtually unknown by the general public; however, the brown cattails of the autumn that become ragged with cottony masses of seeds (technically fruits) are iconic.

Less well-known are the diverse uses of these globally distributed wetland plants. In many places, especially in earlier times, the strap-like leaves were dried and woven into prayer mats and baskets. The tiny seeds produce an oil, the fibers surrounding the seeds can be used for stuffing pillows, mature cattails (the infructescence) can be dipped in kerosene and used as a torch, and all parts of cattails are edible. Without a doubt, cattails are what the ethnobotanist would call a multi-purpose plant.

Here, however, I want to discuss [just one] of the many food uses of cattails. Unlike some edible wild plants, cattails are easy to identify. In fact, they look alike around the globe.

First, find a population of cattails that are in an area not affected by pesticides or polluted waters. Cattails are used for soil and water remediation because they can sequester heavy metals. You don't want a mercury-laced lunch. Once you locate a chemical-free population, keep an eye on it for the collecting season.

In mid- to late-spring, the flowering stem will appear with the developing male (staminate) flowers on top of the female (pistillate) flowers. Each inflorescence bears thousands of flowers. When bands of yellow begin to show in the male inflorescences they are ready to be harvested.

Simply cut off the male stalks and place them in a paper (it must be paper) shopping bag. Fifty stalks will yield about three cups of pollen plus debris. Leave the bag in a cool dry place for week, then shake the bag (closed!) to remove the pollen. Debris from the inflorescence is impossible to completely remove even after careful sieving and sifting with a tea strainer. Pollen can be stored for several weeks in the refrigerator.

*Typha latifolia* in the Apulia region of Italy, indistinguishable from the abundant cattails of the same species found in wetlands throughout the United States. The upper brown portion of the stalk is the spent male flowers. Below are the masses of female flowers at the stage for eating.

Above: The almost mature male inflorescence at the stage for collecting. Below: Pollen cakes. *All photos by Lytton Musselman.*

Pollen can be used in several ways. I simply steam the pollen after forming the grains into fragile cakes in cheese cloth. Steam for one hour. The cakes are less fragile after steaming.

This simple recipe was given me by a Marsh Arab when I was working in Iraq, who told me how highly valued pollen cakes are for medicine and as a tonic. To me, the taste is pleasant and slightly sweet — a good combination with a cup of Arab coffee.

The female inflorescence develops at the same time and is also edible. After removing the male parts, cut the stalk about six inches below the female flowers. You will need sturdy clippers. Using the stalk as a handle, roll the female inflorescence in cornmeal (if you are a Southerner) or flour (if you are from the North) with salt and pepper. Lightly fry in a minimum amount of oil for about two minutes on each side. Rotate the stalks as they fry, avoid burning. Then, using the stalk as the handle, eat it like a corn-dog, though this would be called a cattail-dog.

[This article originally appeared in the Fall 2017 issue of *Chinquapin,* the newsletter of the Southern Appalachian Botanical Society (www.sabs.us). Reprinted with permission.]

Cattails and other examples of wild edible plants can be found in "The Quick Guide to Wild Edible Plants Easy to Pick, Easy to Prepare," by L. J. Musselman and H. J. Wiggins. Johns Hopkins University Press, 2013. ISBN: 9781421408712. 144 pages. 116 color illustr. Second printing June 2017.

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

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

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

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

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

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

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

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