



FRIENDS

OF THE UNIVERSITY
OF MONTANA

HERBARIUM

Spring 2015

Plant Endemism in Montana

By Peter Lesica

The geographic range of plant species is highly variable. Some plants, like bracken fern (*Pteridium aquilinum*), naturally occur across the globe, while others such as Canby's kittentails (*Synthyris canbyi*) have a total range smaller than Missoula County. The latter are often referred to as "narrow endemics." Narrow endemics (hereafter referred to simply as endemics) are of two kinds. "Paleoendemics" are species that had a much larger range in the past but are now confined to a small portion of the old range, presumably because of adverse changes in the climate or associated biotic community (i.e., new pests or predators). For example, giant redwoods once had a much larger range but are now confined to a few areas of the Sierra Nevada Range in California. "Neoendemics" have evolved relatively recently. They may have evolved from a more widespread species but became adapted to an unusual ecological environment. Endemics found only on toxic soils such as serpentine are examples. Neoendemics may also occur because they have speciated in isolation from other related populations and have not had enough time to obtain a larger geographic range. Most endemics in Montana would be considered neoendemics.

Endemism is common in some places but not others. Narrow endemism is rare in the Great Plains portion of North America but common in the southwest, especially California and adjacent Oregon. A high degree of narrow endemism is often explained by dispersal limitations due to the presence of mountain ranges or deserts that restrict the movement of pollen and seeds. Highly diverse geologic substrates and associated soils is another common explanation for narrow endemism. The Great Plains area has few, if any, geological barriers and relatively homogeneous soils over large areas. On the other hand, California is a hotbed of tectonic activity with young mountain ranges and deserts and a great deal of geologic and soil diversity. So explanations involving dispersal limitation and soil diversity appear robust in these cases.

There is another factor involved in the distribution of endemism in western North America. The western portion of Montana has numerous mountain ranges and a good deal of geologic diversity as well. However, only 5% of Montana's flora are narrow endemics (total range less than 1/3 the area of Montana), while it is more than twice that for states farther south. Alberta is similar to Montana in its low degree of endemism. The explanation

(Continued on page 5)



Penstemon flavesceus occurs only in the Bitterroot Range of Montana and adjacent Idaho. Photo: Peter Lesica

Notes from the Board

Well, it hasn't always been that I viewed herbaria as large historical tombs, but recently, after getting our single cabinet "herbarium" at the Beaverhead-Deerlodge NF entered into an Excel spreadsheet, I became aware of the rich history on each shelf. Of most interest to me were the early collections. From our single tomb, we have collections from 1901 and 1903. Excited at first, I found these dates to be of little significance to those typically immersed in herbaria, but for others in my office, it's a great selling point for the value and importance of keeping our single unit.

Curious about the historical collections at other herbaria, I searched the websites of herbaria in the area and realized that the "oldest specimen" is a common bragging point for them as well. Searching the oldest specimen in herbaria databases is not an easy task, since you typically search by year, specimen, or collector, so I asked around for some oldest specimen information and found that the oldest specimen at MONTU is up for debate because of poor penmanship. Some think a *Pedicularis sylvatica* dated 1816 (or is it "1876", or the "18th" of May) is the likely candidate. While possibly a *Smodingium andrieuxii* from 1834 is the oldest. MONT's oldest specimen is a *Leucocrinum montanum* dated 1880.

The WTU Burke Museum's oldest collection is a *Carex aquatilis* specimen dated 1868, and stamped with the "Powell's Colorado Exploring Expedition."

Feeling like I was wading through headstones at a cemetery, I thought a look back east might be worthwhile as exploration in the eastern U.S. obviously occurred much earlier. So I contacted the Harvard University Herbaria, where several 1769 specimens from South America hold the title of oldest specimen. The first American collection housed there is from 1786, a *Grindelia hirsutula* from Monterey, California, coinciding with early California explorations.

Amidst all these dates, the history behind the collections, the explorations, and the botanists is a very fascinating subject, and the knowledge contained by herbaria staff is so comprehensive that I hoped someone had written an historical account for me to dive further into. Little did I know that Peter Lesica and Rachel Potter are in the process of editing a collection of essays on Montana botanists, and that some of these articles were first seen in the pages of this newsletter. Though my current herbarium use doesn't go much past my single cabinet and searches on the PNW consortium of herbaria, I do await a good read on the history within the tombs.

Jessie Salix

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HERBARIUM



**DIVISION OF
BIOLOGICAL SCIENCES
UNIVERSITY OF
MONTANA
MISSOULA, MT 59812**

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FRIENDS IS TO SECURE
SUPPORT FOR AND TO
ENRICH THE
COLLECTIONS AND
OPERATIONS OF
THE UM HERBARIUM*

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2015 FRIENDS OF THE HERBARIUM ANNUAL MEETING

The Annual Meeting of the Friends of the UM Herbarium will be held Saturday, November 14 from 10 AM to 2 PM. The meeting will be held in Rm. 202 of the Natural Sciences Building on the UM Campus. This is the annual meeting of the Board of Directors and is open to the membership.

A Celebration in Honor of Peter Stickney

Approximately 80 people turned out on February 5th to recognize the generous gifts of Peter Stickney to the University of Montana Herbarium. What came to be known as “Stickneyfest” brought together a wide range of people united in showing gratitude for Peter’s large financial contributions to the UM Herbarium, and his non-monetary gifts of time, energy, and talent.

Peter’s influence on plant science and Montana’s natural history stretches back to the late 1950’s when he started his research career with the Forest Service. He became curator of the Missoula Research Center Herbarium, where he worked until his retirement in 1995. Peter continues to curate the MRC Herbarium, even since the specimens were moved to MONTU in 2009. Throughout his retirement Peter has been very active in the herbarium and involved in public education in support of native plant conservation.

The February event took place on the 3rd floor of the Natural Sciences Building, where the MONTU herbarium is located on the University of Montana campus. Marilyn Marler gave a short presentation during the festive event (page 4), highlighting Peter’s

contributions to MONTU. She also read e-mails and letters to Peter from colleagues with whom he has worked over the years, describing the positive influence Peter has had on their careers. Notable attendees included University President Royce Engstrom, Associate Dean of Biological Sciences Charles Janson, and many of Peter’s children and grandchildren.

Although Peter has been the largest single contributor to the Endowment, his generosity set off a flurry of giving from other Friends of the Herbarium. Thousands of dollars have been collected and deposited in the Endowment, all in Peter’s honor. The fund is managed by the UM Foundation, and currently stands at just under \$60,000.

Peter’s goal in establishing the endowment was to grow the account enough to fund a full-time curator. Interest from the fund is currently being used for student employee wages, which significantly enhances the herbarium’s productivity. These student work-study wages are matched dollar-for-dollar by the University.

Contributions to the Peter Stickney Endowment can be mailed to Friends of the Herbarium, Department of Biological Sciences, 32 Campus Dr. HS 104, Missoula, MT 59812. Donations can also be made through the UM Foundation website: www.supportum.org.

Shannon Kimball



Peter Stickney (left) talks with UM President, Royce Engstrom. Photo: Andrea Pipp

Farewell to Marilyn

After a year and a half directing the activities of the MONTU herbarium, Marilyn Marler has decided to move on to other projects. Marilyn stepped into the lead position in the herbarium after the departure of curator and collections manager Dave Dyer. She threw her energy and creativity into updating the herbarium's daily operations. She immediately saw room for improvement in the process of accessioning new specimens. Working with dependable work-study student Grace Johnson and dedicated volunteer Virginia Vincent, Marilyn set out to smooth bumps in the workflow and reorganize.

Accessioning is a multi-step process. It became apparent to Marilyn that more hands were needed to deliver new plant acquisitions from dusty boxes on herbarium shelves to MONTU's cabinets. Marilyn decided to widen the volunteer base to speed up the process, enlisting many students and community

members in the process. The herbarium is now humming with activity most days, with many hands working diligently, and volunteers and staff enjoying each other's company.

Marilyn deems enlisting more herbarium volunteers as one of her two greatest contributions to the herbarium. The other is the initiation of the photography of the University of Montana's herbarium collection (see article on page 5).

Marilyn's future plans include devoting more time to her other two jobs as Missoula City Council Alderwoman and University of Montana Natural Areas Specialist. The herbarium has been very fortunate to have her passion and foresight. "Marilyn has been outstanding in moving the mission of the herbarium forward on all fronts," says UM's Associate Dean of Biological Sciences Charles Jansen. "We will miss her energy and infectious enthusiasm, but hope that she will continue to be active as a Friend."

Shannon Kimball



Marilyn Marler addresses the gathering in honor of Peter Stickney. Photo: Ken Stoltz

Thanks to new members of the Friends!

Your continued interest and support is what makes us effective. Thanks, and welcome to these new members.

Douglas Parker and Marybeth Clark
Karen (Kelly) Chadwick

MONTU NEWS BRIEFS

Publications

Ertter, B., R. Elven, J. L. Reveal and D. F. Murray. 2014. *Potentilla*. Pp 121-218 in FNA Editorial Committee (eds.), Flora of North America Volume 9. Magnoliophyta: Picradeniaceae to Rosaceae. Oxford University Press, New York.

Phipps, J. B. 2014. *Crataegus*. Pp 491-643 in FNA Editorial Committee (eds.), Flora of North America Volume 9. Magnoliophyta: Picradeniaceae to Rosaceae. Oxford University Press, New York.

Zika, P. F., B. L. Wilson and J. Kirschner. 2015. The *Luzula comosa* complex (*Luzula* section *Luzula*, Juncaceae) in western North America. *Phylotaxa* 192: 201-229.

Endemism (Continued from page 1)

seems to be recent glaciation. Ice covered more than half of the mountainous portion of the state little more than 10,000 years ago. It seems likely that many endemic plants were present in northwest Montana before the last glacial epoch, but did not survive through to the present.

Nearly two-thirds of Montana's narrow endemics belong to five families: Asteraceae (18), Brassicaceae (17), Fabaceae (11), Plantaginaceae (10), and Apiaceae (9). One-third of these species are in four genera: *Physaria* (9), *Erigeron* (8), *Astragalus* (8), and *Penstemon* (8). The northeast portion of Montana has no narrow endemics, while the mountainous southwest has the most. There are two "hot spots" of endemism in the state: the northern Bighorn Basin and adjacent valleys south of Billings have ten narrow endemics, and the Bitterroot Range of west-central Montana has eight. Interestingly, the former has mainly calcareous soils and an arid climate, while the latter is dominated by granitic parent materials, acidic soils, and a wet climate. It doesn't seem that the presence of endemism in Montana's flora depends on the presence of unusual or toxic soils because although about 40% of

Montana's narrow endemics are restricted to calcareous soils, that is approximately how many of our mountain ranges are limestone. However, it is true that endemism is strongly associated with the mountainous part of the state.

Mountains can curtail gene flow between populations. In the absence of gene flow from surrounding populations, an isolated population can become closely adapted to its environment and eventually evolve into a separate species. These new species will have a small geographic range and dense populations because they are so well-adapted to their environment. This is often what is found in the field — geographically rare plants are common where you find them.

Further reading:

Harrison, S. P. 2013. Plant and animal endemism in California. University of California Press, Berkeley.

Lesica, P., R. Yurkewycz and E. E. Crone. 2006. Rare plants are common where you find them. *American Journal of Botany* 93: 454-459.

Vascular Collection Photographs Going On-line

The Spring 2011 issue of the Friends of the University of Montana Herbarium newsletter published an article by Matt Lavin titled "Consortium for Pacific Northwest Herbaria Online Portal." The University of Montana Herbarium (MONTU) is proud to announce an update to this large and ongoing project.

In the winter of 2013 MONTU acquired the digital photography equipment from Montana State University Herbarium (MONT). Prior to this, MONTU had finished digitizing the label information for all 70,000 Montana herbarium specimens for the Consortium for Pacific Northwest Herbaria Online Portal. Our dedicated team of volunteers and staff has been patiently photographing, mending, and annotating our Montana specimens to ensure that the most up-to-date and highest quality information and images are available. As of this printing over 37,000 pictures have been taken and matched with the label information that is online.

Our primary volunteer on this project, Virginia Vincent, comes in for nine hours per week to photograph and mend specimens. Associate collections manager Grace Johnson then processes the raw photos into working JPG's and renames each picture so it can be matched online to the corresponding label information. We average around 4,000 photographs a month that are sent to the University of Washington Herbarium (WTU), the leader of this project, where they are made available to the public (www.pnwherbaria.org/). At our current rate we believe we will finish photographing the vascular collection by

summer 2015. The Denver Botanical Garden processed the entire MONTU mushroom collection into its own Online Portal project, in much the same way our vascular collection has been, over the summer of 2013 (www.mycportal.org).

A. Grace Johnson



Volunteers Grace Johnson (left) and Brianne McAllister.

Volunteers Keep Us Running!

For the past year we've enjoyed the continued help of seasoned volunteers (photos page 7), and welcomed some new faces and hands. From mounting plants to data basing, and from filing specimens to photographing them for the World Wide Web, our volunteers have been productive. We've averaged 70 hours per month of volunteer help.

Charles Hackett has been volunteering for more than a year, and you can see that he has started to adapt to the herbarium dress code. Charles' forte is mounting plants and sharing botany with kids. He sometimes brings his own kids to the herbarium. Charles is pictured with long-time volunteer Virginia Vincent who continues the gargantuan effort of photographing all of our specimens for the on-line database project. We are well over 2/3 finished with that project, thanks to Virginia.

Jordan Meyer-Morley helps with mounting, filing, photography, and training new volunteers to mount specimens. It's always helpful to have someone with a good eye teaching the skill to newcomers. This is Jordan's second winter volunteering at MONTU. In the summer she works at MPG Ranch as a botanist, and she is also in a Missoula band called No Fancy. We admire her versatility and appreciate her energy and expertise.

Undergrad Tiffany Shelton started volunteering this summer. She quickly mastered several different tasks, and we are happy to report that she has recently joined the staff as one of our work-study students. We especially value Tiffany's data basing skills and attention to minutia. Tiffany is a Wildland Restoration major at UM, and we are glad she will be with us for a few more semesters while she finishes school. Little known fact about Tiffany: she also drives the Park N Ride buses for ASUM transportation. That's a lot of vehicle!

Lauren Sullivan graduated from UM in 2010 with a major in Anthropology and minor in Wildland Restoration. She's back in Missoula after several years of botany field work in Nevada and across the west. She's hoping to settle in Missoula and enjoys volunteering in the herbarium because it's fun and keeps her in contact with the botany community.

Most of our volunteers spend time with us for the sheer joy of botany and our charming personalities, but we want people to know that you can earn academic credit for working in the herbarium, too. Brianne McAllister, Wildlife Biology major at UM,

earned an upper division biology credit for helping us with mounting plants and accessioning specimens donated by the Craighead family last year. Bri has a great eye for mounting plants and has been a wonderful spokesperson for herbarium internships.

Men enjoy the herbarium too, but they are apparently harder to photograph. We are happy to welcome undergraduates Doug Tyte, Erik McLaury, and Dan Pendergraft. Retired wildlife biologist Jeff Shryer also joins us from Gardiner, Montana.

Thanks, men!

We've been fortunate to have Montana botanist Shannon Kimball volunteering since last October. You might know Shannon from the Montana Native Plant Society or perhaps from the field guides she has co-authored with Peter Lesica. She's taken a lead position on several projects and was recently hired to be curator of the UM Herbarium.

This is a fun group of people to work with, and we are grateful for all of our volunteers.

Marilyn Marler

Visitors to the University of Montana Herbarium in 2014

General Public and Private Consultants

Diane Winter, Douglas Tyte, Erik McLaney, Tom Watson, Marirose Kuhlman, Cedar Brant, Ron Pagel, R. R. Shupe, Matt Ogden, Scott Mincemoyer, Steve Cooper, Drake Barton, Kathy Lloyd, Nancy Seiler, Wease Ballman

UM Researchers and Students

David Gibbs, James Hollopeter, Lisa Nickison, Hunter Schmitz, James Habeck, Charlene Bullen, Andrea Pipp (MNHP)

Federal, State, Tribal, NGO Biologists

Chris Carlson (City of Missoula), Eva Masin (USFS), Craig Odegard (USFS)

Other Academic Researchers

Mirabai McCarthy (FVCC), Nicolas Glynos (FVCC), Loren Bahls, Cindy Bertek (MSU Extension)

Activities

The Clark Fork Chapter of the Montana Native Plant Society held three meetings in the herbarium during the winter of 2015. In January Peter Lesica presented on Montana species of fleabanes (*Erigeron*). Andrea Pipp came over from Helena in February to provide an introduction to Montana lichens. In March, MNPS members assembled for a work night.

Thanks to Our Volunteers!



Undergraduate Doug Tye (above) has been volunteering in the herbarium.

Charles Hackett has volunteered for more than a year and enjoys sharing the herbarium with kids. Virginia Vincent (right) is our long-standing volunteer in charge of photographing all of our specimens for the on-line database project.



Jordan Meyer-Morley works at MPG Ranch as a botanist during the summer.



Tiffany Shelton, a Wildland Restoration major at UM, is now a work-study student in the herbarium.



Lauren Sullivan graduated from UM in 2010 with a major in Anthropology and minor in Wildland Restoration.

YES! *I want to help protect the irreplaceable collections and enhance the facilities of the University of Montana Herbarium*

- | | | |
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Send checks to:
Herbarium-Division of Biological Sciences–
The University of Montana – Missoula, MT
59812

Dues are for a period of **two** years. Dues for current members are payable in even-numbered years. New memberships are accepted at any time. All contributions to the Friends are tax deductible to the full extent provided by law. All checks should be made payable to: U.M. Foundation/Friends of the U.M. Herbarium.

Dues may also be paid online at: <http://umfoundation.onlinemontana.org>

1. Click on “Click here to Submit a Gift”
2. In the list of possible funds to donate to, **uncheck** the first box, scroll down to the last entry “Other” and type in “Friends of UM Herbarium, Fund #29H”
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