



Castilleja

The Newsletter
of the Wyoming
Native Plant Society

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Alpine buttercup (*Ranunculus adoneus*) is one of 10 members of its genus found above timberline in the mountains of Wyoming. This species can be recognized by its glabrous, finely dissected leaves, large, 5 petaled, yellow flowers, and stems over 8 cm tall. It can be found in wet meadows and streambanks in the Absaroka, Gros Ventre, Teton, Wind River, Wyoming, Salt River, and Medicine Bow ranges in Wyoming. Illustration by W. Fertig from *The Alpine Flora of the Rocky Mountains* by Richard Scott (see review on page 7 of this issue).



WNPS News

Scholarship Winners: The WNPS Board received a number of outstanding applications for the 1997 student scholarship award. Rather than choose just one, the Board decided to split the \$600 in the scholarship fund among three deserving candidates. Barbara Packer, a University of Wyoming graduate student from Cheyenne, received an award for a floristic survey of the Laramie Range. Her study is part of a 2-year effort to better catalogue the diversity of vascular plant species in the Laramie Range from Casper Mountain to the Colorado state line. Lynn Kinter, a graduate student at UW from Dubois, received an award to complete her studies of grassland and shrubland ecology in the Upper Wind River watershed. Part of her work will focus on studying soil samples from the habitat of the Dubois milkvetch (*Astragalus gilviflorus* var. *purpureus*), a narrowly restricted endemic of the Dubois badlands. Finally, Mark Lyford, a UW graduate student from Laramie, received an award to study the past vegetation history of the Bighorn Range by collecting and analyzing fossil pollen cores from several mountain lakes. It is hoped that the examination of past changes in vegetation will be useful in predicting future changes that might result from global warming. The Board would like to extend its thanks and encouragement to all of the recipients of this year's award and to those who submitted other worthwhile applications.

The scholarship award is completely funded through the generous donations of members of WNPS. Thanks to all who have contributed in the past.

1997 Annual Meeting/Field Trip Reminder: The 1997 annual meeting and field trip is scheduled for Saturday, July 26 and Sunday July 27. We plan to meet at the Ft. Laramie National Historic Site (between the town of Ft. Laramie and Wheatland) at 8:30 AM on Saturday. We also plan to tour BLM lands in the Torrington sand hills country and Guernsey State Park. Look for more details in the May issue of *Castilleja*.

Election: A slate of candidates for the WNPS Board will appear on the ballot/renewal notice in the May newsletter. It is not too late to nominate someone (perhaps yourself?) for one of these jobs!

New Members: Please welcome the following new members of WNPS: Denise Culver (Ft. Collins, CO),

Mary Hecktner (Yellowstone NP), Laura Welp (Laramie), and Susan Winslow (Bridger, MT).

We're always looking for new members: Do you know someone who would be interested in joining WNPS? Send their name or encourage them to contact the Society for a complimentary newsletter.

Attention Readers: We are always looking for articles and illustrations for the newsletter. Items for the May issue are needed by 30 April 1997.

Treasurer's Report: Balance as of 20 March 1997: General Fund \$603.46; 1996-97 Student Scholarship Fund \$0.00; Total funds: 603.46 WF

Wyoming Native Plant Society
1604 Grand Ave., Laramie, WY 82070

President: Jennifer Whipple (Old Faithful)

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Newsletter Editor: Walt Fertig (307) 745-5026 (wk)

Contributors to this issue: John Baxter, Bill Brenneman, Charmaine Delmatier (CD), Hermione Dreja, Susan Erwin, Walter Fertig (WF), Jeanne Janish, Stuart Markow (SM), and C.L. Porter.

Below: Bur oak (*Quercus macrocarpa*) by C.L. Porter.



Editorial

The Endangered Species Act and Plants: Cutting Through the Confusion

By Walter Fertig

Awareness and concern for endangered animals has grown tremendously since the passage of the Endangered Species Act (ESA) nearly 25 years ago. This is especially true in a state like Wyoming, where such high profile threatened and endangered species as the black-footed ferret, gray wolf, grizzly bear, bald eagle, and peregrine falcon all occur. Discussion and debate over the ESA and its ramifications on everyday life have become commonplace today.

A very different situation exists in the botanical world. Threatened and endangered plants receive far less attention than their vertebrate kin, even though they make up nearly 60% of the current roster of Endangered species nationwide. A lot of confusion exists regarding the degree of protection that plants receive under the ESA. Such misunderstandings are especially dangerous because they can erode society's support for the Act. Public support is critical if the conservation goals of the ESA are to be achieved at the local level where rare species actually occur.

The most common "myth" regarding plants and the ESA is the idea that rare plants receive the same amount of protection as animals under the ESA, especially on private lands. In reality, the ESA's Section 9 rules on "take" and habitat protection on private property apply primarily to animals. Landowners are not prohibited by the ESA from harming listed plants or destroying their habitat on their own property, unless they are receiving federal money for a development project. This follows a long legal tradition, dating to Roman law, in which plants are viewed as the property of the landowner. By contrast, animals have historically been considered property of the monarchy or society, but not of the private citizen on whose property they might reside.

Amendments to the original ESA do provide a few protections for listed Threatened and Endangered plants on private lands. Plants are protected from illegal harvest or take by people trespassing on private land and are protected from interstate trade. These provisions were enacted primarily to protect commercially valuable species, such as rare cacti, from overharvest. The use of certain herbicides that are hazardous to listed plants may also be restricted on private lands under rules adopted by the Environmental Protection Agency.

The main protection for listed plants under the ESA comes on public lands. Under Section 7 of the Act, federal agencies are required to consult with the US Fish and Wildlife Service to ensure that government actions do not negatively impact a listed species. The use of public lands by private citizens, industry, and agricultural leaseholders may be restricted under the ESA if such uses are not compatible with the needs of an endangered species.

The protection of the ESA applies only to plants that are officially listed as Threatened or Endangered (or have been formally proposed for listing). It does not apply to the hundreds of "candidate" species, many of which should be listed, but the proper documentation has yet to be completed. Most federal land management agencies have adopted internal policies to protect these candidate species and to ensure that agency actions do not contribute to the need to list them under the ESA. This proactive approach has been useful in providing needed management attention for a number of rare species on BLM and Forest Service lands, without invoking the ESA.

The second major source of confusion regarding endangered plants is the lack of information on the management needs of these species. Both proponents and opponents of the ESA often assume that drastic management changes must be made when a species becomes listed, or when a previously listed plant is discovered at a new site. The management needs of a given species often vary from site to site, and are dependent on a number of factors, including the species' life history characteristics and dependence on natural disturbance. In many situations, the best management may be the continuation of current activities (with or without slight modifications). People often fail to realize that rare species are fairly sensitive indicators of habitat condition, and their presence at a site may suggest that existing management activities have been compatible with them.

One final mistake regards the fear of additional information on the locations and natural history of endangered plants. There is often a common feeling that information can only be used against landowners and other users. In reality, more and better information can vastly improve management actions and prevent our limited conservation resources from being used inappropriately. In Wyoming, there are a number of cases in which additional field research has resulted in the removal of plant species from consideration for listing under the ESA due to the discovery of many additional populations. Research can also clarify the management needs of a species, resulting in improved practices and the elimination of unneeded land-use restrictions.

The key to overcoming current misunderstandings about the ESA and plants is through improved education and outreach. This is especially important in order to address the concerns of private landowners, public land users, and other "stakeholders" who are (or perceive that they are) negatively impacted by endangered plants. Better outreach is needed to make people aware of what rare species may be present in their local area and their actual level of protection and management needs. Without education, the long-term survival of many of our rarest plants will remain in jeopardy.

[Editorials in *Castilleja* reflect the views of the author and are not necessarily those of the WNPS Board. Contrasting viewpoints or opinions on other issues are welcome].

A Look at *Linum* and Linen

By Susan Erwin

(Reprinted from Sage Notes, a publication of the Idaho Native Plant Society, May 1994)

Linum lewisii is one of nearly 100 species in the genus *Linum*, a member of the flax family (Linaceae). Members of this family may be found throughout the world in both hemispheres, and may be one of the most important vegetable fibers from the standpoint of widespread and continuous usage. Most of us know it as that pretty yet frustrating blue perennial that drops its petals when picked and opens only a few blossoms at any one time.

Although found throughout the world, in North America, flax species are common in the west and midwest in dry, sunny habitats with well-drained soils. Flowers can be white, blue, yellow, or red. Petals stay on the plant for only a short time after blooming. Blue flax is a handsome plant commonly used as an ornamental in landscape gardening.

In the west, prairie flax was first described by Meriwether Lewis near the Continental Divide in Montana on the Lewis and Clark Expedition. It has been written that Native Americans used the plant in baskets, mats, snowshoes, fish nets, strings, and cords. Flax species in general are considered poor to fair as livestock forage. Some species are poisonous to livestock, containing cyanide compounds in the seeds.

The European species of flax, *Linum usitatissimum*, was imported and widely cultivated by the early American colonists, and later on the prairies as Americans headed west. Diminishing supplies of imported textiles in the early 17th Century necessitated growing flax in the colonies to provide fiber for weaving textiles. The Massachusetts General Court ordered boys and girls to be taught to spin, and families to grow a certain amount of flax each year, or pay a fine!

The first true linen industry started in the early 18th Century in New Hampshire by Scottish-Irish immigrants. Linen textiles were considered a status symbol during that time and continue to be considered a finer quality fabric. By the 19th Century, production of linen shifted from hand weaving and spinning to factories and automated machines. The transition to automation was slow in coming because of the difficulty in processing flax's brittle fibers. Eventually, cotton replaced linen as the fiber of choice because it was easier to process and was more readily available.

Linen requires approximately one year from seed-sowing to finished product. More labor intensive than cotton or wool, linen garments last just as long and actually improve with age and wear. Processing involves drying the plants, then beating them to separate the inner pith from the woody fibers. These fibers are then carded, combed, and spun in much the same way that wool is processed. Other uses for flax are linseed oil from the seeds and as a medicine for inflammation, coughs, ulcers, and burns.

Below: Blue flax (*Linum lewisii* or *L. perenne* var. *lewisii*) by Jeanne R. Janish (Flora of the Pacific Northwest).



Oaks in Wyoming

By Walter Fertig

Wyoming can lay claim to many things: spectacular scenery, abundant wildlife, a rich flora. But one thing the state cannot claim is an abundance of oaks. Compared to the southwest, New England, or the eastern US, the state's oak flora is positively anemic. Only two of the 60-odd species of oaks (*Quercus*) found in North America occur in Wyoming, both of which barely make it across the state line.

Oaks belong to the beech family (Fagaceae), one of the most widespread and ecologically significant plant families in the Northern Hemisphere. In terms of total global biomass, the Fagaceae are second only to the Pinaceae. Economically, the family is noteworthy as a source of timber (oaks alone provide about half of the hardwood lumber produced annually in the US), as well as commercial cork, chemicals for curing leather, and nut crops. The beech family is considered one of the more primitive of the living families of flowering plants due to their woody, arborescent growth form and petal-less flowers borne in unisexual (often elongate) catkins. The Fagaceae have an extensive fossil history, with pollen records dating back to the middle of the Cretaceous Period over 90 million years ago.

Oaks can be distinguished from other members of the beech family by their unique fruit: the acorn. Acorns are single-seeded, hard-shelled nuts borne within a cup of numerous, overlapping woody scales. Each acorn is derived from a single pistillate flower located at the base of young leaves. Acorns of "white oaks" take one year to mature, lack hairs on the inner shell wall, and are often edible. In contrast, acorns of "red" or "black" oaks take 2 years to ripen, have hairy inner walls, and are usually too bitter for human consumption. Acorns from edible species are high in B vitamins and protein, but most humans prefer to taste acorns indirectly, in the form of pork, turkey, deer, or other game.

Many oaks can also be recognized by their distinctive lobed or toothed leaves. Members of the white oak group are characterized by round lobed or entire leaves, while species in the red or black group have hairlike bristles on tooth-like leaf edges. Unfortunately, a wide variation of leaf shapes can occur within a given population (or even on the same individual), making leaves a somewhat unreliable character for differentiating between species of oaks. The leathery leaves of most oaks would appear to restrict their use as forage, although deer may browse them extensively.

Although it is our most common species, the bur oak (*Quercus macrocarpa*) is found only in the Black Hills region of the state. Bur oak gets its name from the mossy fringe (or bur) of elongate scales making up the cup of the acorn. This species can also be recognized by its 5-9 round-lobed leaves that often appear to be divided below the middle by at least one pair of deep indentations. Depending on its habitat, bur oaks may grow to 80 feet and have broad crowns of stout, spreading branches, or form dense scrub thickets 6-8 feet high.

Bur oak is commonly found in the understory of ponderosa pine forests in the Black Hills. Following fire suppression or the removal of pines by logging, bur oak may become the

dominant forest species. It may also form extensive savanna-like stands on outcrops of the barren Mowry Shale.

Gambel oak (*Q. gambelii*) is far less abundant in Wyoming, being known only from dry canyon slopes in the foothills of the Sierra Madre in Carbon County. This species is able to reproduce by suckering and may form extensive clones of scrubby trees less than 25 feet tall. In Wyoming, the leaves of Gambel oak are usually elliptic, deeply 5-7 rounded-lobed, and glossy yellowish-green. Elsewhere in its range (across the SW United States), Gambel oak may have extremely variable foliage and appears to hybridize readily with other taxa. As a result, *Q. gambelii* has been split into no less than 8 other species in the past.

Both bur and Gambel oak can be quite common just beyond the state's borders. Spring frosts and summer drought appear to be the chief factors restricting the range of these species in Wyoming. To appreciate oaks in Wyoming, one is forced to seek them out in the far corners of the state, which only adds to the satisfaction of finding these magnificent trees.

Below: Gambel oak (*Quercus gambelii*). Ill. By Hermione Dreja.



Botany Briefs

Botanical News from Wyoming and the Rocky Mountain Region

Winter Rust Collecting in Wyoming: Editor's note:

While flowering plants are dormant for the winter, rust fungi are still active. Our intrepid mycologist, Dr. John "Barney" Baxter, reports on a day of "fungusizing" this winter:

On January 8, 1997, the following rust fungi were collected within the city limits of Laramie:

- Puccinia tumidipes* on *Lycium halimifolium*
- Puccinia subnitens* on *Triglochin maritimum* (old aecia) and *Distichlis stricta*
- Puccinia stipae* on *Stipa comata* and *Koeleria macrantha*
- Puccinia cryptandri* var. *luxurians* on *Sporobolus airoides*
- Endophyllum tuberculatum* on *Alcea rosea*
- Puccinia helianthi* on *Helianthus annuus* and *Iva xanthifolia*
- Puccinia similis* on *Artemisia tridentata*

With one exception, all rusts were in the overwintering teliospore stage, and obviously all were on dead leaves and stems, except for the *Artemisia* rust. JB

Botany/Ecology Courses at Western Wyoming

College: Western Wyoming College (WWC) is offering a mini series in Botany and Ecology-related courses taught by Charmaine Delmatier and Stuart Markow. Look for the following classes coming up in the spring and summer:

Desert Ecology: April 19 and April 26. Cost \$43. Most of the field time will be spent south of Green River. Students will be exposed to the limiting factors of a high, cold desert plateau and how these factors affect the growth and development of desert plants. For more information, please contact WWC in Rock Springs at 382-1600.

Common Plant Families of Southwest Wyoming: June 6-8. Cost \$43. Students will be exposed not only to the common plant families of southwest Wyoming, but also to many of the rare plants occurring in the lower Green River Basin. Basic morphological differences between five common plant families will be emphasized, as well as basic principles of classification. Tentative schedule: June 6 (lecture) 6-9 PM, June 7 (field trip) 8 AM-4 PM, June 8 (lab) 9 AM-1 PM or 1-5 PM. Please contact WWC in Green River at 875-2278.

Common Grasses of Southwest Wyoming: June 13-15. Cost \$43. The focus of this class will be on field recognition of the common grasses of SW Wyoming. Topics will include classification, basic grass morphology, recognition of common genera, and identification of grasses using dichotomous keys.

Tentative schedule: June 13 (lecture) 6-9 PM, June 14 (field trip) 8 AM-4 PM, June 15 (lecture/lab) 9 AM-1 PM or 1-5 PM. Please contact WWC in Green River at 875-2278.

Alpine Vegetation Ecology: August 9-10. Cost \$53. This course will be conducted on Rendezvous Mountain in the Jackson area. After taking the tram to the top of the mountain, we will spend the night at the Gros Ventre Campground. The cost of the tram and campground is included in the course fee. This time of year is the peak of alpine flowering. Students will be introduced to environmental factors that influence the growth and development of common alpine plants with emphasis on their adaptations to extreme conditions. Recognition and discussion of both common and rare alpine plants will also be emphasized. Tentative schedule: August 9 7:30 AM meet at WWC Green River Campus, 7:30-11 AM drive to Jackson Hole Ski Resort, 11:30-12 PM meet at bottom of tram, 12 PM-4:30 PM ride tram to top of Rendezvous Mountain. August 10 8 AM breakfast, 9 AM-11 AM lecture/slides/lab, 12 PM-3 PM field observation/discussion. For more information, contact WWC in Green River at 875-2278. CD and SM

Wyoming Species in the National Collection of

Endangered Plants: Just as zoos have taken on the role of maintaining and breeding rare animal species for future reintroduction to the wild, a growing number of botanical gardens across the United States are developing "seed banks" of threatened and endangered native plant species. Seeds, cuttings, and live plants representing over 500 rare species are currently being maintained in the National Collection of Endangered Plants, a collaborative effort of 28 botanical gardens and arboreta affiliated with the Center for Plant Conservation. In our region, the Denver Botanical Garden and the Nebraska Statewide Arboretum are taking the lead in conserving the following rare plant species from Wyoming:

- Aletes humilis* (Larimer aletes)
- Artemisia porteri* (Porter's sagebrush)
- Astragalus barrii* (Barr's milkvetch)
- Cirsium ownbeyi* (Ownbey's thistle)
- Cryptantha subcapitata* (Owl Creek miner's candle)
- Descurainia torulosa* (Wyoming tansymustard)
- Gaura neomexicana* ssp. *coloradensis* (Colorado butterfly plant)
- Parthenium alpinum* (Alpine feverfew)
- Penstemon gibbensii* (Gibbens' beardtongue)
- Sphaeromeria simplex* (Laramie false sagebrush)

Many other species are in need of similar attention. In the coming year, the Nebraska Statewide Arboretum has plans of adding *Cirsium aridum* (Cedar Rim thistle) and *Yermo xanthocephalus* (Desert yellowhead) to its seed bank. Anyone interested in learning more about the National Collection should contact the Center for Plant Conservation, Missouri Botanical Garden, PO Box 299, St. Louis, Missouri 63166-0299. WF

Lichens in the Medicine Bow Range

By Bill Brenneman

Last Fall, above Telephone Lakes in the Snowy Range, at an alpine-subalpine ecotone, I noticed seedling Engelmann spruce (*Picea engelmannii*) growing from a mat of the lichen *Lepraria neglecta*. Foresters have long known that at optimal altitudes conifer seeds germinate best on mineral soils. However, at stressful high altitudes spruce seedlings may only survive when protected from the winds by this cryptogamic crust. Also these lichen crusts capture atmospheric nutrients and retain moisture for higher plants.

At a grass-Douglas-fir ecotone on Jelm Mountain (Elev. 9200 ft), I observed Douglas-fir seedlings growing from between the thalli of the dog lichen (*Peltigera canina*). The cyanobacteria (blue-green algae) in this lichen fixes atmospheric nitrogen which is much needed in poor boreal coniferous soils. Colorimetrically I have ascertained there is more nitrogen in the soil beneath this lichen than in nearby soils devoid of the dog lichen.

For more information, I recommend Thomas Nash's new book "Lichen Biology" (published by the University of Cambridge, 40 West 20th St, NY, NY 10011-4211).

Below: *Lepraria neglecta* mat above Telephone Lakes, Snowy Range. Photo by Bill Brenneman.



Botanist's Bookshelf

The Alpine Flora of the Rocky Mountains: Volume 1 The Middle Rockies. By Richard W. Scott. 1997. University of Utah Press, Salt Lake City, UT. 901 pp. \$110.00

In 1966, Richard Scott received his Master's Degree in botany from the University of Wyoming for his thesis "The Alpine Flora of Northwest Wyoming". In the years since, Dr. Scott has kept an active interest in alpine plants and their environment in Wyoming and the Rocky Mountain west, while maintaining a busy teaching schedule as a professor at Central Wyoming College. Dick's 30-plus years of experience has been captured in a new book "The Alpine Flora of the Rocky Mountains".

For fans of alpine plants, it has been well worth the waiting. Scott has produced a volume that is at once scientifically credible, but also user-friendly and a visual delight. Volume 1 covers over 600 species found above timberline in the mountains of southwest Montana, western and southeastern Wyoming, and northeastern Utah. Each species account includes a full description, complete synonymy, a discussion of habitat and range, a line drawing, and a dot distribution map. The maps are especially useful in that they include county lines and topography (with mountain ranges shown by shaded relief). The range maps also include non-alpine areas, giving the reader a better context in which to place the distribution of a given species.

In addition to the species accounts, the book also includes chapters on the alpine environment, geography, and floristics. These chapters are complemented by an extensive glossary of alpine and plant terminology, a list of authors of plant names, chromosome counts, and bibliography.

This book is the first in a projected three-volume set that will cover the alpine flora of the entire Rocky Mountains. Additional volumes will address the southern Rockies (Colorado, Utah and New Mexico) and the northern Rockies (Montana and Canada). When completed, this series will stand along with the Intermountain Flora and Flora of the Pacific Northwest as major regional references.

Volume 1 is a large book (8 1/2 x 11 inches) and probably too bulky to use in the field (especially on long mountain hikes without benefit of a horse or able-bodied assistant). Nevertheless, it should prove to be an invaluable reference for researchers and nature lovers upon their return from an alpine adventure. WF

Flowers of the Canyon Country. By Stan Welsh and Bill Ratcliffe. University of Utah Press, Salt Lake City, UT. \$15.95.

Illustrated in color are one hundred species of flowering plants from the canyon country of Utah. Includes information on distribution, habitat, size, and flowering time.

The Botany Songbook

Krashing Through the Krummholz
(Tune: Tiptoe Thru the Tulips)*

Krashing through the krummholz,
Through the krummholz,
In the Snowy Range,
I'm krashing through the krummholz today.

(Foo da racka sacky want some sea food, mama)

It feels kinda scratchy,
Kinda catchy,
Got me tangled up,
I'm krashing through the krummholz today

(Ooo papa dah, oo Papa day, everything is peachy in the USA)

Those white-crowned sparrows are here,
They're here 'cause I spilled my beer.

And now they're weaving,
Kinda staggering,
Chirping merrily,
While I'm tangled up,
I'm krashing through the krummholz today (Hey, hey!)

*Since the recent death of Tiny Tim was aired on television,
this tune should be familiar to everyone.

The Wyoming Native Plant Society, established in 1981, is a non-profit organization dedicated to encouraging the appreciation and conservation of the native flora and plant communities of Wyoming. The Society promotes education and research on native plants of the state through its newsletter, field trips, and annual student scholarship award. Membership is open to individuals, families, or organizations with an interest in Wyoming's flora. Members receive *Castilleja*, the Society's quarterly newsletter, and may take part in all of the Society's programs and projects, including the annual meeting/field trip held each summer. Dues are \$5 annually.

To join the Wyoming Native Plant Society, return the membership form below to:

Wyoming Native Plant Society
1604 Grand Ave.
Laramie, WY 82070

Wyoming Native Plant Society

Name:

Address:

\$5.00 Regular Membership

\$15.00 Scholarship Supporting Member
(\$10.00 goes to the annual scholarship fund)



WYOMING NATIVE
PLANT SOCIETY
1604 Grand Avenue
Laramie, WY 82070