Castilleja

Publication of the Wyoming Native Plant Society

Oct 2006, Volume 25, No. 3

Posted at www.uwyo.edu/wyndd/wnps/wnps_home.htm

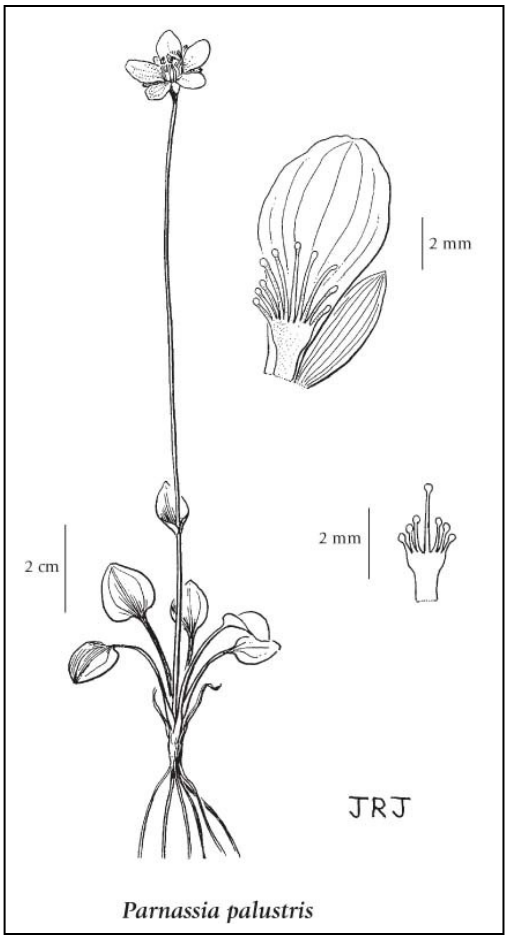
In this issue:

Paradox of Parnassia

"GRASS-OF-PARNASSUS" – how did such a striking wildflower get such an obscure name? This question came up in admiring *Parnassia palustris* on the 2006 Pinedale field tours. The answer leads one back to the world's first scientific author of botany and pharmacology: Pedanius Dioscorides (40 - ca. 90 AD).

Dioscorides was a Greek trained as a physician and he served in the Roman army. He traveled widely, read widely, and collected all of the available information of his time about every substance that could be used to treat human health problems. He included descriptions and illustrations of nearly 600 plants in *De materia medica*, a five volume treatise.

Thanks to Carolus Linnaeus, we share a plant common name used by Dioscorides almost 2000 years ago. *De material medica* reached the hands of Linnaeus, an 18th century botanist and physician who developed a unified classification based on consistent morphological characteristics, represented in universal binomials. Linneaus described the *Parnassia* genus as corresponding with the medicinal plant recognized by Dioscorides, called "Parnassos", the Greek word "of Mount Parnassus." Hence, Grass-of-Parnassus. The "grass" moniker may be an artifact of translations. *Parnassia palustris* var. *montanensis* is found in almost half of the counties of Wyoming (see the atlas posted at: www.rmh.uwyo.edu), one of four species in the state. It is separated by a long time and distance from any *Parnassia* discoveries of Dioscorides, but bearing much the same name. BH



Above: *Parnassia palustris.* Illustration from: George W. Douglas, Del Meidinger and Jim Pojar. 1998-2002. Illustrated Flora of British Columbia. Posted by Klinkenberg, B. (ed.). 2005. E-Flora BC [www.eflora.bc.ca].

WNPS News

New Members: Please welcome the following new members to WNPS: Glenn Bengston, Glendo; Karen and Dean Clause, Pinedale; Robert Giurgevich, Sheridan; Mabel and Robin Jones, Cheyenne; Susan Kramer, Pinedale; Jeanne Newkirk, Cheyenne; Kathleen Priebe, Casper; Rich Reaves, Marietta, Georgia; and Janet Thompson, Gillette.

Wyoming Native Plant Society
P.O. Box 2500, Laramie, WY 82073

WNPS Board – 2006

President: Bonnie Heidel	742-9523
Vice President: Lynn Moore	472-3603
Sec.-Treasurer: Ann Boelter	745-5487
Board Members: Mike Evans,	326-8217
Curtis Haderlie	690-4381

Newsletter Editor: Bonnie Heidel (Laramie; bheidel@uwyo.edu)
Teton Chapter: PO Box 82, Wilson, WY 83014 (Joan Lucas, Treasurer)
Bighorn Native Plant Society: PO Box 21, Big Horn, WY 82833 (Jean Daly, Treasurer)
Webmaster: Melanie Arnett (arnett@uwyo.edu)

Treasurer's Report: Balance as of 9/25/06: General Fund: $1452.75; Markow Scholarship Fund: $1096.50. Total Funds: $2549.25

Call for Candidates
Yes, it's that time of year. It's time to overthrow authority! A nomination committee is being appointed this month to fill the three WNPS officer positions and the one outgoing Board position for 2007. Interested? Please contact: Bonnie Heidel (bheidel@uwyo.edu).

Red-letter Reminders
If you see RED on your mailing label, then this is your red-letter reminder to renew. We are trying a red-letter reminder for expired memberships (lapsed six months past renewal or more) that will make it simpler for everyone.

Scholarship: The 2007 WNPS Markow Scholarship announcement will be in the December issue. The deadline will be in February.

♫

We've Only Just Begun…

Wyoming Native Plant Society is a springboard for all who care about the 2450 native plants found in Wyoming or the landscapes and habitats that they comprise. It is for botanists working at perhaps the lowest density of federal botanists in the lower 48 (5,000,000 acres per botanist). It is for public libraries, gardeners, and educators in the least-populated state of the Union. It is for academics including those at the state's only 4-year university that also happens to have one of the strongest botany departments and herbaria in the region. It is for all Wyophiles. It is common ground for a host of "-ologies". SO, there is no way under the sun to unify such a divergent and *extremely* dispersed membership.

This is leading up to my announcement that the By-Laws amendment did not get enough people responding to represent 2/3 of the current membership. There *was* a signed, synchronized response from 50 people, which qualifies as a bona fide phenomenon in Wyoming, but twice as many were needed for a WNPS By-Laws amendment.

Technically, this means that the 2006 WNPS membership year and the 2006 Board term have only just begun. Practically speaking, members and Board get a 6 month warm up period or grace period that makes reminders, record-keeping and transfer of responsibilities much easier for everyone in the middle of winter rather than in the middle of summer.

Expect a ballot in the December issue, with renewal information. We do not expect to try voting on By-Laws amendments again or at least not under the same approach. …We've only just begun to re-invent ourselves. BH

Contributors to this issue: Walter Fertig (WF), Bonnie Heidel (BH), Carl Jung (CJ), and Hollis Marriott (HM). The next newsletter deadline is November 27.

Arching woolly stolons of Meadow pussytoes (*Antennaria arcuata*) are displayed by Steve Laster (Photo by Susan Kramer)

A potluck picnic hosted by Pinedale Sage & Snow Garden Club garnered rave reviews (Photo by Curtis Haderlie)

Showcasing pink agoseris (*Agoseris lackschewitzii*) is Walt Fertig, who first announced its discovery in Wyoming in 1993 (Photo by Bonnie Heidel)

Among new members participating included Avery Taylor (Photo by Bonnie Heidel)

Gathering at the shores of Fremont Lake, Wyoming's deepest body of water, over 40 folks took the plunge into a weekend of wet wonders in native plants. (Photo by William Gray, Pinedale online)
– *Go to the WNPS homepage to see photos in color.*

Outstanding examples of thermal and cold-water springs were featured at Kendall Warm Springs, a place that harbors eight rare plants and an endemic fish separated from the Green River by travertine deposits (Photo by Walter Fertig)

2006 Annual Meeting Highlights

The 2006 WNPS Annual Meeting, held July 13-15 outside of Pinedale, was a happy success. Activities held that weekend included 6 fieldtrips, lead by Steve Laster, Walter Fertig, Pam Curry, Alison King, Drew and Kit Pflughoft, and Tim Lingle. Pinedale's Sage & Snow Garden Club hosted a lovely potluck picnic for us around the campfire that Saturday evening, served just yards away from the lapping shore of Fremont Lake. Dessa Dale, the evening guest speaker, presented info on native plant cultivation, followed by a Society meeting around the campfire and late night talk. Book sales were featured for the first time, conveniently housed in a lakeside teepee loaned by Pam Curry, and over $300 in publications were sold. The planning team that made it all possible included Carmel Kail, Bettina Sparrowe, Robena Downie, Pam Curry, and Alison King. They also did a lion's share of organizing to ensure that everyone who wanted a camping spot could get one. THANK YOU to all who organized this event and to everyone who came!

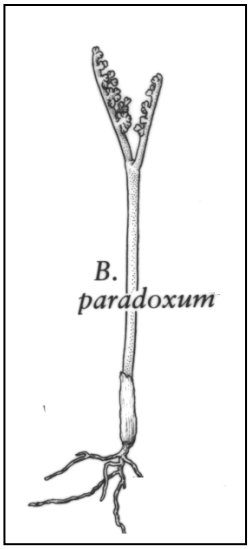
Additions to the Flora of Wyoming

The following six species represent recently discovered native additions to the state flora (Dorn 2001). BH

Alisma subcordatum Raf.
American water plantain (Alismataceae) - Peripheral widespread species of the eastern U.S.
NIOBRARA COUNTY: Growing in the Niobrara River channel, an emergent in standing water most of the year (*Heidel 2870 RM, SDC !G. Larson*) in association with *Schoenoplectus pungens, Eleocharis acicularis, Sparganium emersum, Chenopodium simplex* at an elevation of 1450 m, flowering in August. This species is recognized by Robert Haynes in the *Flora of North America* (2000) and by Robert Kaul (Great Plains Flora Association 1986) but does not appear to be separable from *A. triviale* in the northern Great Plains (Larson 1993). In keys, it is distinguished from *A. triviale* by the small size of fruiting heads 2-4 mm diameter, petals 1-3 mm, and achenes 1.5-2.2 mm long.

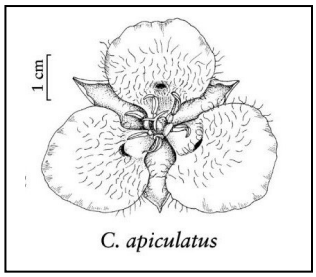
Botrychium pallidum W.H. Wagner
Pale moonwort (Ophioglossaceae) –Northern species sparsely-distributed in Rocky Mountains.
CROOK COUNTY: Growing on steep moss-covered slope between aspen and valley bottom meadow, also on north-facing slope with abandoned roadbed, two occurrences in the Black Hills (*Crook s.n. ISU, King s.n. ISU, Farrar 10356, 10733 ISU*),.in association with *Botrychium simplex, Populus tremuloides, Pinus ponderosa, Fragaria virginiana, Trifolium* spp. at an elevation of 1493-1856 m, with sporophyte maturing in June. It resembles a very pale, dwarf form of *B. minganense*, with up to 5 pair of pinnae and folded blades (Wagner and Wagner 1993).

Botrychium paradoxum W.H. Wagner
Peculiar moonwort (Ophioglossaceae) - Sparsely-distributed species of western North America.
SHERIDAN COUNTY: Growing in moist riparian habitat of the Big Horn Mountains in association with *Botrychium lunaria*, *B. lanceolatum, Deschampsia* spp., *Salix* spp., *Potentilla* spp., *Spiranthes* spp., *Erigeron* spp., *Taraxacum officinale, Astragalus* spp., *Trifolium* spp., *Fragaria* spp. at an elevation of 2530 m, with sporophyte maturing in July (*M. Spann s.n. RM*). The close-up photographs by Andrew King were verified by Donald Farrar. It is distinguished from all other *Botrychium* in having the tropophore replaced by sporophore, yielding 2 sporophores (Wagner and Wagner 1993).



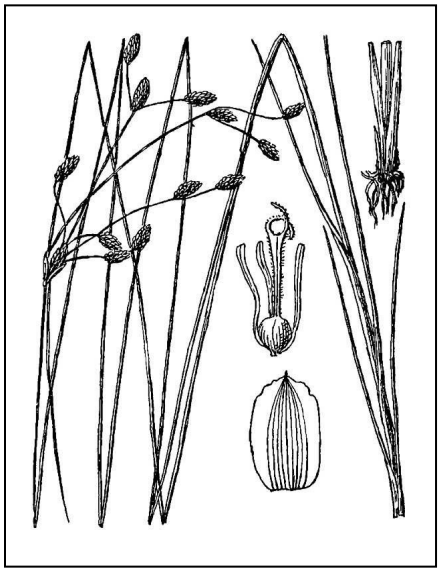
Botrychium paradoxum
In: Wagner & Wagner 1993.

Calochortus apiculatus Baker
Pointedtip mariposa lily (Calochortaceae) - Disjunct species of the northern Rockies.
CROOK COUNTY: Growing in dry, open *Pinus ponderosa* forest in association of the Black Hills with *Juniperus communis, Mahonia repens, Piptatherum pungens, Lupinus argenteus,* and *Arctospaphylos uva-ursi* at an elevation of 1865 m, flowering in July (*J.R. and S.A. Thomasson 3135 FHKSC, BHSC, RM*; Thomasson et al. 2006). Its distribution is limited to northwestern Montana, northern Idaho and adjoining British Columbia about 600 km away. It is distinguished from other *Calochortus* species in the state by the "cat's ear floral syndrome" (Ownbey 1940) in which flowers have pubescent inner petal surfaces.



Calochortus apiculatus. In: Hitchcock et al. 1969.

Fimbristylis puberula (Michx.) Vahl. var. *interior* (Britt.) Kral.
Hairy fimbry (Cyperaceae) - Peripheral Great Plains species.
NIOBRARA COUNTY: Growing in subirrigated wet meadow on the Niobrara River (Heidel 2875 RM, SDC), in association with *Panicum virgatum, Equisetum laevigatum, Muhlenbergia richardsonis, Elymus trachycaulus, Pedicularis pulchella*, at an elevation of 1445 m; in fruit in July-August. The genus has not previously been collected in Wyoming. It resembles the *Scirpus* genus with terminal *(cont. p. 5)*


Fimbristlyis puberula var. interior. In: Britton & Brown, 1913. *An Illustrated Flora.*

Additions to the Flora - *continued from p. 4*
inflorescences usually subtended by 2 or more involucral bracts, and no perianth hairs, bristles or scales; but it has no leaf ligules.

Scirpus pendulus Muhl.
Rufous bulrush (Cyperaceae) - Peripheral widespread species.
CONVERSE COUNTY: Growing in subirrigated wet meadow on Duck Creek, a Cheyenne River tributary, at an elevation of 1530 m (*Heidel 2882 RM, SDC*), in association with *Agrostis stolonifera, Schoenoplectus pungens, Equisetum laevigatum, Elymus trachycaulus, Juncus longistylis*, in fruit in July-August. It has 3 stigmas and a trigonous achene. The species differs from the three other Wyoming species in the *Scirpus* genus (Dorn 2001) in having scales with prominent green midribs, enclosing the perianth bristles within the scales.

References cited

Dorn, R.D. 2001. *Vascular Plants of Wyoming*, 3rd ed. Mountain West Publishing, Cheyenne, WY.
Great Plains Flora Association. 1986. *Flora of the Great Plains*. Univ. Press of Kansas, Lawrence, KS.
Haynes, R.R. and C. B. Hellquist. Alismataceae. Vol. 22. In: Flora of North America Editorial Committee, eds. *Flora of North America North of Mexico*. Oxford University Press, New York, NY.
Larson, G. 1993. *Aquatic and Wetland Vascular Plants of the Northern Great Plains*. Rocky Mountain Forest and Range Expt. Stn. Gen. Tech. Rpt. RM-238. Fort Collins, CO.
Ownbey, M. 1940. A monograph of the genus *Calochortus*. Annals of the Missouri Botanical Garden 27:371-560.
Thomasson, J.R., S.A. Thomasson, and D.E. Mergen. First record of *Calochortus apiculatus* (Liliaceae) in Wyoming. Western North American Naturalist 66(2):251-253.
Wagner, W. H. and F.S. Wagner. Ophioglossaceae. Vol. 2. In: Flora of North America Editorial Committee, eds. *Flora of North America North of Mexico*. Oxford University Press, New York, NY.

Pinedale Country Lost-and-Found

The *Pinedale Roundup* and the *Sublette Examiner* don't include plants in the lost-and-found sections, so this newsletter fills the role. Four discoveries were claimed by Wyoming Native Plant Society 2006 annual meet-goers in Pinedale (July 14-16, 2006.)

Meadow pussytoes (*Antennaria arcuata*) is a pussytoes that wears white wool on its arching stolons, only known in Sublette County from one site -- until this summer. The original discovery for Sublette County was outside of Pinedale by Steve Laster. He and Alison King took tour-goers to a newly-discovered Meadow pussytoes site on BLM lands outside of Daniel. Meadow pussytoes is a regional endemic also present in the Sweetwater River drainage of central Wyoming, the type locality in Blaine County, Idaho, and several stations in Elko County, Nevada.

Hoary willow (*Salix candida*) is a willow shrub with in-rolled margins that wears white wool on its leaf undersides, first seen in Sublette County hanging out around Daniel by George Argus in 1961. It was since documented at the Kendall Warm Springs by Walter Fertig in 1994. Hoary willow was most recently discovered by tour-goers outside of Daniel on quaking boggy habitat encircled by the meadow that supports Meadow pussytoes. Hoary willow is a boreal species that is uncommon in the Rocky Mountains. Many tour-goers also visited the Hoary willow and other unusual species at the Kendall Warm Springs on Bridger-Teton National Forest later the same day, in a botanically-rich afternoon hike lead by none other than Walt Fertig.

Simple kobresia (*Kobresia simpliuscula*) is a member of the Sedge family). It is a tufted grass-like plant distinguished by having unisexual flowers and a sac enclosing the fruit (perigynia) that has an open slit down the sac. It was found in the boggy habitat shared with Hoary willow. It is a boreal species not previously known from Sublette County that is uncommon in the Rocky Mountains.

Pygmy bulrush (*Trichophorum pumilum*) is another member of the Sedge family, and it makes the widespread hardstem and softstem bulrushes of Wyoming look like towering giants. It, too, was found in the boggy habitat shared with Hoary willow (above). It, too, is a boreal species not previously known from Sublette County that is uncommon in the Rocky Mountains.

A wealth of other wetland flowers in bloom set off these and other discoveries in colorful company. Images of saber-tooth tigers were conjured up by tour-goers visiting these "boreal outposts" (see the article on glacial relicts - this issue, p. 6). Plant voucher specimens were collected and will be deposited at the Rocky Mountain Herbarium (RM).

…Did we *lose* any species? Well, certain campers did their best to eliminate a couple noxious weeds from the fantastic flora of Fremont Lake. BH

Wyoming Overview

Glacial Refugia & Relicts

By Bonnie Heidel

(*Editor's Note: The 2006 Pinedale tour-goers partook in many forms of R & R, including refugia-and-relicts! This article provides context for the Pinedale-area plant discoveries, as reported in this issue, and for an earlier article on a few glacial relict species.*)

Hoary willow (*Salix candida*; to right) was featured twice on the 2006 Pinedale area tours: once at Kendall Warm Springs and once near Daniel. These are two of the 14 known extant sites in Wyoming. Illustration by Jeanne R. Jannish; from *Vascular Plants of the Pacific Northwest.*

There's a resurgence of attention given to Wyoming's melting glaciers, which include seven of the ten largest glaciers in the contiguous United States (George 2006). One wonders, if glaciers are melting, what are our glacial refugia and relicts doing? Glacial refugia are vestigial habitats with cold climate conditions that have been relatively stable for plant life, if not continuous since Pleistocene glaciation. They are boreal outposts in temperate latitudes.

Another way to think of glacial refugia is as Mother Nature's refrigerators where the associated flora does not spoil. This is not just a metaphor. One glacial refugia site in Wyoming was Ice Slough (Fremont County), where settlers traveling the Oregon Trail could stop for "excellent ice" that would remain belowground well into summer. Another glacial refugia represented the only palsa fen in the lower 48 states (Collins 1983, Mellmann-Brown 2004).

Glacial refugia harbor relict species that are restricted to the vestigial habitats. Outside of the alpine zone, Wyoming has glacial relict species with three kinds of distribution patterns. First, there are glacial relict species that are widespread at boreal latitudes but sparsely-distributed in the Rocky Mountains (Heidel 2004a). Second, there are disjunct or sparsely-distributed species that are more common in other parts of the Rocky Mountains to the north (e.g., *Prosartes hookeri* separated by over 600 km between northwestern Montana and the Black Hills in Wyoming; Heidel 2002). Third, there are glacial relict species that are reduced to relict distribution patterns throughout their range (e.g., *Sullivantia hapemanii* var. *hapemanii* distributed in a ring around the Big Horn Mountains and in Bighorn Canyon, with outliers in the Owl Creek Mountains, northern Laramie Range, and central Idaho; Heidel 2004b). In many cases, species' fossil pollen and spores are wanting or they cannot be identified to species level. There are very few settings where pollen and spore preserved well. Thus, characterization of glacial relict species in Wyoming is based on Pleistocene research elsewhere and on contemporary distribution and habitat information.

The three kinds of distribution patterns correspond closely to three kinds of glacial refugia. Most of the circumboreal relict species in the Rocky Mountains are found in fens, and many of the rare fen species are glacial relicts (see Table 1; p. 10). *(con. p. 7)*

Glacial refugia and relicts - *continued from p. 6*

Fens are a groundwater-fed subset of peatlands, which have exceptionally stable hydrology and organic soils at the surface that are saturated, anaerobic, cold and nutrient poor. Three of the four species discovered at the 2006 annual meeting inhabit fens, including Hoary willow (*Salix candida*), Simple kobresia (*Kobresia simpliuscula*), and Pygmy bulrush (*Trichophorum pumilum*); (see p. 5, this issue). There are also circumboreal glacial relict species found in cold-air drainages (e.g., *Adoxa moschatellina*). Second, there are Rocky Mountain glacial relict species found on sheltered north-facing slopes and valley, as found in the Black Hills. Third, there are a few relict species that are uncommon throughout their range and reduced to relict distribution patterns, as is the case of *Sullivantia hapemanii* var. *hapemanii* (above), restricted to springs, spring-fed streams and cliff seeps. The remainder of this article will focus on fen plants as the largest set of glacial relict species.

Relict fen species are better-documented and more concentrated in montane landscapes. Therefore, the majority of glacial relict species occurrences in Wyoming are in national forests or national parks (Table 1, p. 10), including at least seven national forests and two national parks. The fen species include 16 Forest Service sensitive species in the Rocky Mountain Region (Reg. 2), and 45 Wyoming plant species of concern; most of which are relict species.

Efforts to reconstitute glacial relict habitat in the Rocky Mountains have met with little or no success, as in the case of fen restoration research (Cooper 1990, Cooper and MacDonald 2000, Johnson 1996). Fen habitat was identified as an important natural resource that cannot readily be replaced (U.S. Forest Service 2002, U.S. Fish and Wildlife Service 1999). At least one glacial refugia site rich in glacial relict species has also been designated as a Special Interest Area by the USDA Forest Service: Swamp Lake, the largest known fen in the state (in Shoshone NF of USDA Forest Service – Rocky Mountain Region).

Fens were included as wetlands originally protected under the Clean Water Act (1972). Recent rulings of the U.S. Supreme Court determined that protection of isolated wetlands exceeded the authority of the U.S. Army Corps of Engineers (and by default, all other federal agencies). Most fens are hydrologically isolated in some sense (Bedford and Godwin 2003). Agency policies to maintain fens may be challenged by more recent rulings, to result in _____ [fill-in-the-blank]. The answer is not clear, but the future of glacial refugia and relicts in Wyoming may hinge on more than climate. BH

References cited

Bedford, B.L. and K.S. Godwin. 2003. Fens of the United States: distribution, characteristics, and scientific connection versus legal isolation. Wetlands 23(3): 608-629.

Collins, E. 1983. Bogs and fens. Wyoming Native Plant Society News Letter 3(1): 3-4.

Cooper, D.J. 1990. An evaluation of the effects of peat mining on wetlands in Park County, CO. Unpubl. Rept., prepared for Park County.

Cooper, D.J. and L. H. MacDonald. *2000.* Restoring the Vegetation of Mined Peatlands in the Southern Rocky Mountains of Colorado, U.S.A.. *Restoration Ecology* 2000 8:2 103

Heidel, B. 2002. Additions to the Wyoming Flora. Castilleja 21(4):4.

Heidel, B. 2004a. Relicts and Refugia. Castilleja 23(3): 1, 9.

Heidel, B. 2004b. *Sullivantia hapemanii var. hapemanii* (Hapeman Sullivantia): A Technical Conservation Assessment. Report to U.S. Forest Service Region 2. Posted at http://www.fs.fed.us/r2/projects/scp/assessments/index.shtml

Johnson, J.B. 1996. Environmental function, vegetation and the effects of peat mining on a calcareous fen in Park County, CO. Unpubl. Rept to US EPA Region VIII.

George, J. 2006. Are Wyoming's frozen reservoirs slipping away? UWYO Magazine, Vol. 8(1).

Mellmann-Brown, S. 2004. Botanical and ecological inventory of selected peatland sites on the Shoshone National Forest. Prepared for Shoshone National Forest. Wyoming Natural Diversity Database. Laramie, WY.

USDA Forest Service. 2002. Wetland protection – fens. Memo of 19 March 2002 from Marisue Hillard, Director of Renewable Resources in the Rocky Mountain Region, to Forest Supervisors. Regional directive. Denver, CO.

USDI Fish and Wildlife Service. 1999. Regional Policy on the Protection of Fens, As Amended, from the Regional Director (Region 6), to Project Leaders for Ecological Services, Refuges and Wildlife, and Fish and Wildlife Management Assistance. Denver, CO.

A Good Book for Wyoming Plants

Ode, D. 2006. *Dakota Flora* (266 pp, $29.95), South Dakota State Historical Society Press, Pierre, SD. http://www.sdhistory.org/rp/rp_press.htm; or (605) 773-6609 or – as well as from Amazon.com.

I have often been asked "Is there a good book for Wyoming plants?" Unfortunately, when it comes to identification, plants are not as cooperative as birds. The 800 birds of North America fit into a single field guide with color illustrations for each. But there are some 2500 plant species in Wyoming alone, and the differences among them can difficult to discern even with the best of descriptions and photos. My response typically is a discussion of two books, both of which we are fortunate to have. Bob Dorn's *Flora of Wyoming* offers a comprehensive treatment in a compact and affordable form, but is a technical manual with no photos. *Wildflowers of Wyoming* by Diantha and Jack States offers descriptions and photos of over 325 of our common wildflower species, but this is only 13% of our flora. What to do?

Now I have a third book to recommend to Wyoming plant enthusiasts: *Dakota Flora* by Dave Ode. *Dakota*?!? Fortunately the floras of Wyoming and South Dakota are sufficiently similar that we can enjoy this wonderful book of essays and photographs. With only 82 species its usefulness may seem limited, but identification isn't everything, as Ralph Waldo Emerson pointed out:

> "…these young scholars who invade our hills … love not the flower they pluck, and know it not, and all their botany is Latin names."

If you read *Dakota Flora* you will avoid Emerson's wrath. Ode's essays provide an impressive diversity of information about his chosen subjects including adaptation, anatomy, art, evolution, ecology, conservation, pollination, paleontology, poetry, physiology, philosophy, medicinal use, wildlife use, human history, human nature, landscaping, love, literature, music, mysticism, whimsy and the best flour for Indian fry bread.

The pasqueflower (*Anemone patens/Pulsatilla patens*) is familiar to most of us and is a favorite flower for many, being one of the first colorful signs that winter is ending. Not surprisingly, it is a common subject of poems, such as the tribute to 'that bold bit of life at the edge of the snows' by South Dakota's poet laureate, Badger Clark. But how many of us would have suspected the secret behind the shyness of the pasqueflower, which Ode reveals? There is plenty to learn about other well-known charismatic flowers, such as the trickery of the beautiful fairy slipper or calypso orchid (*Calypso bulbosa*), and the intricate relationship between our yucca (*Yucca glauca*) and its pollinator, the yucca moth.

Ode also gives deserved attention to plants that usually are overlooked or ignored. He describes the fascinating lives of duckweed (*Lemna*), too often written off as 'pond scum'. Sedges (*Carex*) are given their due as critical to the health of wetlands and wetland wildlife. Though they look like grasses, they are not, and with Ode's helpful hints perhaps more amateur naturalists will come to recognize and appreciate the sedges. Even DYCs (disgusting yellow composites) are praised. Those of us who have made a profession of identifying plants often harbor some ill-feeling towards species groups whose members are difficult to distinguish, and many species in the sunflower family present this kind of challenge, hence the DYC designation. But I will never again look past a ragwort (*Senecio*) now that I know of the Ragwort Fairy, whose 'gallant gold array' is there to greet me even when the prime of the season is past.

There is at least one large high-quality photograph for each of the plants featured in *Dakota Flora*, but these are much more than identification aids. Some are works of art, such as the beautiful portrait of the diminutive Easter daisy (*Townsendia exscapa*), and the surrealistic landscape of duckweed on pond. Others bring a smile, for example the photo of a small child posing next to the giant taproot of a bush morning-glory (*Ipomaea leptophylla*). Many provide close views of features we might overlook – the Japanese lanterns of ground cherries (*Physalis* spp.), net-covered textile onions (*Allium textile*), tiny moonworts (*Botrychium*), the deep convolutions of the yellow morel (*Morchella esculenta*) and the subtle beauty of grass flowers. *(cont. p. 9)*

Continued from p. 8

Dave Ode is Botanist/Ecologist for the South Dakota Natural Heritage Program. I first ran into Dave in 1984, give or take a year, amongst the cabinets of the herbarium at Black Hills State University in Spearfish, South Dakota. In the years since, I have enjoyed and appreciated the breadth of his knowledge and his dedication to understanding, building appreciation for and conserving our wild plants. Not knowing what Dave had been up to, I was taken by surprise to find his book in my mailbox, but it was no surprise to find such wonderful essays and photos inside. I know that any project of this scale is not completed without significant pain, and so 'thanks' to Dave for his persistence and dedication. Many will enjoy the fruits of his labor (and the flowers).

Plains buffaloberry (*Shepherdia argentea*) as posted by a Saskatchan photographer at: (http://www.colinherb.com).

To see what this image looks like in color, go to the WNPS homepage.

Buffaloberry Jelly

What wild fruits are better *after* the frost? -- Wyoming's own Plains buffaloberry (*Shepherdia argentea*) is sweeter and at least as easy to harvest after frost as before. The simplest harvest technique involves spreading a cover on the ground and beating the fruits off of branches with a stick onto the cover.

The branches taper to thorn-like stubs that deter hand-picking (I can attest). The brightly colored fruits are deep red to orangish red, 0.5-0.7 cm in diameter, and seeds are fairly large. The berries were often used by Native Americans to flavor buffalo meat (hence, the name), and might be used with wild game.

According to Harrington (1967), Plains buffaloberries harvested before frost do not need pectin. I have only tried it after frost, with pectin (following the recipe for currant jelly on the package). Here are the "summer" and "fall" recipes for berries collected before or after frost. This makes a clear, golden jelly that can be tinted by adding cranberry or chokecherry juice to the water. The pectin content of the berries is higher in summer and sweetness is higher after frost.

Summer Jelly

Wash and crush berries and add ½ cup water to every 2 quarts of fruit. Boil slowly for 10 minutes, stirring frequently to prevent scorching. Put into a jelly bag or 3 layers of damp cheese cloth and drain off juice. To each cup of juice add 1 cup sugar. Bring to a boil and boil until it jells by the standard "jelly test" and pour into jars.

Fall Jelly

Wash and crush berries and add 1 ½ cups of water for every 5 quarts of fruit. Bring to full boil; cover and simmer for 10 minutes. Put into a jelly bag or 3 layers of damp cheese cloth and drain off juice. Measure sugar into bowl (3/4 cup of sugar for every cup of juice). Mix ¼ cup of the sugar and 1 box Sure-Jell into juice. Bring to a full rolling boil over high heat, stirring constantly. Quickly stir in remaining sugar, and return to a full rolling boil for 1 minute. Remove from heat and pour into jars.

You may also want to experiment with "buffaloberry ice cream." The mashed berries produce heavy foam when whipped.

WARNING: Wyomingites at higher elevations do NOT have a substitute in Canada buffaloberry (*Shepherdia canadensis*). As Harrington (1967) stated: "…we have often tried these bitter buffaloberries [Canada buffaloberry] both raw and cooked and cannot recommend them very highly. The best we can say is that we have never become actually ill from eating small quantities of them." BH

Botanica –

(Or odds and ends from the botanical world)

Seed Banks Save Rare European Grasses

By Walter Fertig

It is not often that an extinct species gets a second chance, but fortune recently smiled on an annual grass endemic to calcareous meadows of eastern Belgium and adjacent France. The "Brome of the Ardennes" a.k.a. *Bromus bromoideus* was once locally abundant in the farming provinces of Liege and Luxembourg (not to be confused with the independent nation of the same name), but changes in agricultural practices in the early 1900s resulted in a precipitous decline and no plants have been observed in the wild for nearly 70 years. For several years, the species continued to persist under cultivation, but ultimately these populations died out as well. Fortunately, small numbers of seed were maintained in a number of university and private collections, although often not under optimal conditions (one set of seeds was discovered in an attic).

In 2004, Dr. David Alpin, a British botanist working at the National Botanic Garden of Belgium, became intrigued by the demise of the Brome of the Ardennes and began consolidating the surviving sets of seed. A small batch was dispatched to Kew Garden's Millennium Seed Bank for germination trials. Despite low viability (ranging from 1-35% for various seed collections), Kew researchers successfully germinated seed in September 2005, and for the first time in many years *Bromus bromoideus* was once again alive and well. Seedlings are now being grown in the greenhouse and in the wild to increase the number of available seed and to hopefully reestablish natural populations in Belgium.

Although most seed banks used for plant conservation are stored "*ex situ*" (off-site in a museum or laboratory), a recent case study in Austria has demonstrated the utility of on-site (*in situ*) seed banks in species recovery. Moss grass (*Coleanthus subtilis*) is a rare grass found naturally on exposed mud flats bordering small ponds across much of central Europe. Its range has contracted greatly in recent years due to the loss of wetlands on the continent and the grass was thought to be extirpated in Austria until its rediscovery in 2000. Researchers at the BOKU University in Vienna began to systematically reinventory historical populations of Moss grass throughout Austria and collect soil cores to see if any seeds remained. To their surprise, viable Moss grass seed was still present in 6 "extinct" populations and often at high density. These seeds, stored safely on-site and awaiting the next drought to expose suitable mud bank habitat, are now being used to establish new populations elsewhere in Austria.

Table 1. Fen Indicator Plants of Wyoming

(See glacial relicts article, p. 6)

Scientific Name	Common Name	G Rank	S Rank	Peatland Affinity in WY	FS Status	WYNDD Track?		Bighorn NF	Black Hls NF	Bridg-Tet NF	Med Bow NF	Shoshone NF	Targhee NF	Wasatch NF	Gr Teton NP	Yellowst NP
Amerorchis rotundifolia	Round-leaved orchid	G5	S1	**Obl**	**Sens R2**	**Y**						**X**				
Arctous rubra (Arctostaphylos rubra)	Red manzanita	G5	S1	**Obl**	**Sens R2**	**Y**						**X**				
Botrychium virginianum	Rattlesnake fern	G5	S1	**Fac**		**Y**		**X**	**X**			**X**	**X**		**X**	**X**
Carex buxbaumii	Buxbaum's sedge	G5	S2	**Obl?**		**N**						**X**		**X**	**X**	**X**
Carex capillaris	Hair-like sedge	G5	S2	**Obl?**		**N**		**X**		**X**	**X**	**X**			**X**	
Carex concinna	Beautiful sedge	G4G5	S1	**Obl?**		**Y**			**X**	**X**		**X**				
Carex cusickii	Cusick's sedge	G5	S2	**Obl?**		**Y**									**X**	**X**
Carex diandra	Lesser panicled sedge	G5	S1S2	**Fac?**	**Sens R2**	**Y**					**X**	**X**			**X**	**X**
Carex echinata	Little prickly sedge	G5	S1	**Fac?**		**Y**									**X**	**X**
Carex flava	Yellow sedge	G5	S1	**Obl?**		**Y**										**X**
Carex gynocrates	Northern bog sedge	G5	S2	**Fac**		**N**										
Carex lasiocarpa	Slender sedge	G5	S1S2	**Obl**		**N**						**X**				**X**
Carex leptalea	Bristly-stalk sedge	G5	S2	**Obl**		**Y**			**X**		**X**	**X**	**X**		**X**	**X**
Carex limosa	Mud sedge	G5	S2	**Obl**		**Y**		**X**		**X**	**X**	**X**	**X**			**X**
Carex livida	Livid sedge	G5	S2	**Obl**	**Sens R2**	**Y**						**X**				**X**
Carex microglochin	False uncinia sedge	G5	S2	**Obl**		**Y**				**X**		**X**				**X**
Carex magellanica (C. paupercula)	Bog sedge	G5	S1	**Fac**		**N**					**X**					
Carex parryana var. unica	Hall's sedge	G4?Q	S1	**Fac?**		**Y**					**X**					

Scientific Name	Common Name	G Rank	S Rank	Peatland Affinity in WY	FS Status	WYNDD Track?		Bighorn NF	Black Hls NF	Bridg-Tet NF	Med Bow NF	Shoshone NF	Targhee NF	Wasatch NF	Gr Teton NP	Yellowst NP
Carex scirpodes var. scirpiformis	Canadian single-spike sedge	G5	S1	Obl		Y						X			X	
Cypripedium parviflorum var. pubescens	Yellow lady's-slipper	G5t?	S1S2	Fac	Sens R2	Y		X	X							
Drosera anglica	English sundew	G5	S2	Obl	Sens R2	Y						X			X	X
Dulichium arundinaceum	Three-way sedge	G5	S1	Fac?		Y										X
Epilobium oregonense	Oregon willow-herb	G5	S2S3	Fac		N					X					
Epilobium palustre var. palustre	Swamp willow herb	G5	S2	Fac		N				X	X	X				X
Epipactis gigantea	Giant helleborine	G4	S1	Fac	Sens R2	Y									X	X
Equisetum fluviatilie	Water horsetail	G5	S1	Fac		Y						X			X	X
Eriophorum callitrix	Sheathed cotton-grass	G5T5	S1	Obl?		Y						X				
Eriophorum chamissonis	Russet cotton-grass	G5	S2	Obl	Sens R2	Y		X				X				X
Eriophroum gracile	Slender cottongrass	G5	S1	Obl	Sens R2	Y				?	X	X	X		X	X
Eriophorum scheuzeri	Scheuchzer cotton-grass	G5	S1	Obl		Y				X		X				
Eriophroum viridicarinatm	Green keeled cottongrass	G5	S1	Obl		Y						X			X	X
Gentianopsis simplex	Hiker's gentian	G4	S1	Obl?		Y										X
Juncus brevicaudatus (J. tweedyi misappl.*)*	Narrow-panicled rush	G5	S2	Fac		N										X
Juncus filiformis	Thread rush	G5	S1	Fac		Y					X	X	X		X	X
Kobresia simpliciuscula	Simple kobresia	G5	S1	Obl	Sens R2	Y						X				
Lomatogonium rotatum	Marsh felwort	G5	S2	Fac		Y					X					
Lonicera caerulea	western honeysuckle	G5	S2	Fac		N				X						X
Menyanthes trifoliata	Bog buckbean	G5	S2S3	Fac		N		X		X	X	X	X		X	X
Muhlenbergia glomerata	Marsh muhly	G5	S1	Fac		Y			X		X	X				X
Packera indecora	Plains ragwort	G5	S1	Fac		Y						X				
Petasites sagittata	Arrowl-leaf Sweet Coltsfoot	G5	S2	Fac		N					X	X				X
Potentilla palustris	Marsh cinquefoil	G5	S1S2	Obl		N					X	X				X
Potamogeton amplifolius	Large-leaved pondweed	G5	S1	Fac?		Y		X		X	X	X				
Potamogeton epihydrous	Ribbon-leaf pondweed	G5	S1?	Fac?		N					X					
Potamogeton illinoiensis	Illinois pondweed	G5	S1	Fac?		Y				X		X				
Potamogeton praelongus	White-stem pondweed	G5	S1	Fac		Y					X	X				
Potamogeton robbinsii	Flat-leaf bladderwort	G5	S1	Fac?		Y				X	X					X
Potamogeton zosteriformis	Flatstem pondweed	G5	SH	Fac?		Y									X	
Primula egaliksensis	Greenland primrose	G4	S1	Obl	Sens R2	Y				X		X				
Salix barrattiana	Barratt willow	G5	S1	Obl?		Y						X				
Salix candida	Hoary willow	G5	S2	Obl	Sens R2	Y				X	X	X				X
Salix farriae	Farr's willow	G4	S2	Fac		N				X		X				X
Salix myrtillifolia var. myrtillifolia	Myrtleleaf willow	G5T5	S1	Obl	Sens R2	N						X				
Salix serrisima	Autumn willow	G4	S1	Obl	Sens R2	Y					X					
Scheuzeria palustris	Pod-grass	G5	S1	Obl?		Y										X
Schoenoplectus subterminalis	Water bulrush	G4G5	S1	Obl		Y										X
Selaginella selaginoides	Low spike-moss	G5	S1	Fac?	Sens R2	Y				X			X			X
Sparganium natans (Sparganium minimum)	Small bur-reed	G5	S1	Obl?		Y					X	X			X	X
Symphyotrichon boreale (Aster borealis)	Boreal aster	G5	S2	Fac		N				X	X	X				X
Thalictrum alpinum	Alpine meadow-rue	G5	S2	Fac?		N				X	X	X				
Trichophrorum pumilum (Scirpus pumilus)	Pygmy bulrush	G3Q	S1	Obl		Y				X	X	X				
Utricularia intermedia	Flat-leaf bladderwort	G5	S1	Obl		Y										
Utricularia minor	Lesser bladderwort	G5	S2	Obl	Sens R2	Y		X			X	X			X	X

Autumn Metaphor*

By C. G. Jung

Life has always seemed to me like a plant that lives on its root. Its true life is invisible, hidden in the root. The part that appears above ground lasts only a single summer. Then it withers away – an ephemeral apparition. When we think of the unending growth and decay of life and civilization, we cannot escape the impression of absolute nullity. Yet I have never lost a sense of something that lives and endures underneath the eternal flux. What we see is the blossom, which passes. The root remains.

*A headline was added for purpose of this newsletter. From: C. G. Jung. 1965. *Memories, Dreams, Reflections*. Previously unpublished writings of Carl Jung, edited by A. Jaffe. Vintage Books, New York, NY.

Wyoming Native Plant Society
P.O. Box 2500
Laramie, WY 82073

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, including the annual meeting/field trip held each summer. To join or renew, return this form to:

Wyoming Native Plant Society
P.O. Box 2500, Laramie, WY 82073

Name: _____

Address: _____

_____

Email: _____

___ $7.50 Regular Membership
___ $15.00 Scholarship Supporting Member
($7.50 goes to the Markow Scholarship Fund)