Castilleja

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Sniffing Out Endemic *A s t r a g a l i*

Wyoming is richly endowed in members of the *Astragalus* (milkvetch) genus, and 17 of its 79 taxa are state or regional endemics. Two endemics are selenium-absorbers, *Astragalus nelsonianus* (Nelson's milkvetch) and *A. racemosus* var. *treleasei* (Trelease's racemose milkvetch), bearing striking inflorescences with a characteristic *essence-of-selenium*. They were sniffed out across Wyoming in 2002 status surveys.

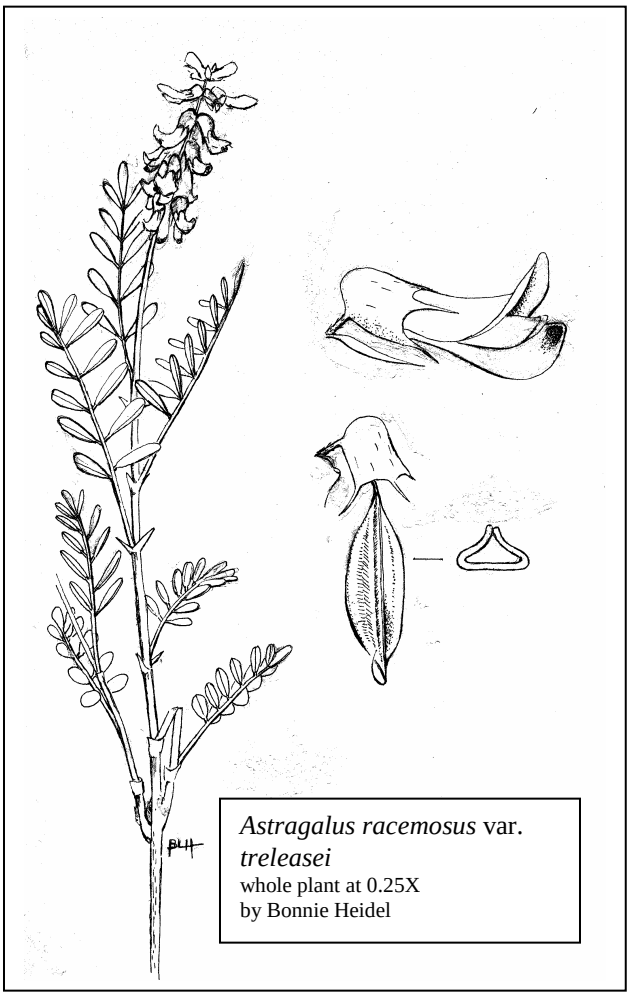
They are generally out of harm's way for livestock and off the beaten path for most botanists. However, the first collection of Trelease's milkvetch in Wyoming, by Reed Rollins in 1939, persists in a public rest area. Interestingly enough, Trelease's milkvetch was found to have lower selenium levels than its widespread relatives (Porter 1945, Trelease and Beath 1949).

Trelease's milkvetch is now known from 12 extant records and 1 historic record over a limited area of 3 counties. It is distinguished from the widespread eastern varieties by its white flowers, and from *A. canadensis* by its basally-attached hairs. Nelson's milkvetch is now known from 30 extant and 4 historic records over a broad area of 3 counties, and a change in its Wyoming species of concern status is pending. BH

References

Porter, C.L. 1945. Two tioid *Astragalus* novelties from the Rocky Mountain Region. Madroño 8(3): 99-102.

Trelease, S.F. and O. A. Beath. 1949. Selenium, its Geological Occurrence and its Biological Effects in Relation to Botany, Chemistry, Agriculture, Nutrition, and Medicine. Published by the authors.



Astragalus racemosus var. *treleasei*
whole plant at 0.25X
by Bonnie Heidel

In this issue:

WNPS NEWS –
ELECTION RESULTS

Jennifer Whipple, new WNPS President, drops to her knees before Shoshonea on Heart Mountain.

Wyoming Native Plant Society
PO Box 3452, Laramie, WY 82071

President: Jennifer Whipple (Mammoth) - 344-7988
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Thanks to all who ran for office
and voted in the spring WNPS elections

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Newsletter Editor: Bonnie Heidel (Laramie; email: bheidel@uwyo.edu)
WNPS Webmaster: Joy Handley (Laramie)
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)

Treasurer's Report: Balance as of 15 Oct 2002: General Fund $776.87; Student Scholarship Fund $412.50; Total funds: $1189.37.

Howard's forget-me-not (*Erytrichum howardii*) on a memorable Heart Mountain hike (see annual meeting report, p. 4)

New Member: Please welcome the following new WNPS subscribers/members: Sublette County Library, Pam Cornelisse (Denver, CO), Peter Ebertowski (Laramie), Luann Lum (Laramie), Lynne Schwartz (Venice, FL), Floye Wells (Ft Collins, CO).

Jean Daley, new WNPS Vice-President, scouts Absarokas horizons from Bald Ridge.

Contributors to this issue: Jane Dorn (JD), Robert Dorn (RD), Erwin Evert (EE), Walter Fertig (WF), Bonnie Heidel (BH), Pam Cornelisse (PC), Stuart Markow (SM1), and Sally Madden (SM2). We are pleased to reprint contributions of John Baxter. The next deadline for newsletter submissions is 5 December.

What Happened to All the Lilies?

by Robert Dorn

(Editor's note: The Liliaceae [Lily Family] is among the revised families in the current state flora; see "Changing Times, Changing Floras," Castilleja 20(4). The 21 Lily genera in Dorn (1992) are split into 12 families in Dorn (2001). He chronicles the break-up of the "original" Lily Family in this article. Look for more taxonomic counseling services in future issues.)

In the 2nd edition of Vascular Plants of Wyoming, there were 21 genera in the Lily family. In the 3rd edition there were only four. What happened to the other 17 genera? First we must appreciate that our 21 genera are only a handful of the many genera that occur worldwide. Secondly, the family Liliaceae has served as a catch-all family for rather diverse plants. *Asparagus* certainly doesn't much resemble *Erythronium* (glacier lily), and *Xerophyllum* (beargrass) doesn't much resemble *Allium* (onion). Some of the more obviously out-of-place genera were removed from the Liliaceae earlier such as *Yucca* to the Agavaceae.

We now have a fair amount of molecular data to complement the many other types of data that were available previously. Two large books that summarize the available data have appeared recently (Kubitzki 1998; Wilson & Morrison 2000). Based mainly on molecular data, but supplemented by many other kinds of data, our genera fall into three different orders, the Liliales, the Asparagales, and the Alismatales. The genus *Tofieldia* (false asphodel) falls within the Alismatales which is far removed from the Liliales, so the family Tofieldiaceae can be justified easily. Eight genera fall within the Asparagales, an order that is more closely related to grasses, sedges, irises, and orchids than it is to lilies. It is rather easy to justify removing these eight genera from the lily family. The remaining 12 genera fall within the Liliales. These are a little more difficult to deal with and there is still disagreement on how some of these should be treated.

Let us first look at the Asparagales genera. Within this order, our eight genera segregate into five clades so we can justify five different families: Alliaceae for *Allium* (onion), Anthericaceae for *Leucocrinum* (sand lily), Hyacinthaceae for *Camassia* (camas), Themidaceae for *Androstephium* (funnel lily) and *Triteleia*, and Asparagaceae for *Asparagus*. *Maianthemum* (false lily-of-the-valley) and *Polygonatum* (Solomon's seal) with their broad leaves and other differences fall into the same clade as *Asparagus* so they can justifiably be placed in their own family, Convallariaceae.

In the order Liliales, our 12 genera segregate into two well supported lineages: *Veratrum* (false hellebore), *Zigadenus* (death camas), *Xerophyllum* (beargrass), and *Trillium* in one lineage, and the remaining eight genera in the other. The former four genera have been placed in the family Melanthiaceae. *Trillium* is a monophyletic group embedded in the Melanthiaceae and some workers prefer to place it in its own family, Trilliaceae. Others prefer to treat it as a tribe within Melanthiaceae. Four of the remaining eight genera are true lilies that have remained in the Liliaceae: *Erythronium*, *Fritillaria*, *Lilium*, and *Lloydia*. That leaves four more genera to deal with: *Calochortus* (mariposa), *Prosartes* (fairybell, formerly *Disporum*), *Streptopus* (twisted stalk), and *Smilax* (greenbriar). Historically, it is interesting to note that Aven Nelson in the Coulter and Nelson Manual of 1909 included *Disporum* and *Streptopus* in the family Convallariaceae and *Smilax* (as *Nemexia*) in its own family Smilaceae. In recent years *Smilax* has been placed in its own family Smilacaceae by more workers and it can now be justified with molecular data. Embryological, karyological, and molecular data support placing *Streptopus*, *Prosartes*, and *Calochortus* into a separate family Calochortaceae. There is some disagreement here, however, and some workers keep these three genera in the Liliaceae.

There are other families that have served as catch-all families such as the Scrophulariaceae and Rosaceae. The former is already in the process of being broken up. Perhaps in the future the rank of order will become the convenient first level for identification much like the family has been. On the other hand, with computerization, it should be easier to bypass these higher groups altogether. The drawback of that approach is that we may then lose our ability to see relationships.

References

Kubitzki, K. (ed.). 1998. The families and genera of vascular plants. III. Flowering plants. Monocotyledons. Lilianae (except Orchidaceae). 478 pp.

Wilson, K. L. & D. A. Morrison (eds.). 2000. Monocots: systematics and evolution. CSIRO Publishing, Collingwood, Australia. 738 pp.

(See p. 7 for information on ordering the new *Flora of North America* volume on Liliales at discount price.)

REPORT OF ANNUAL MEETING 15-16 June 2002

Heart Mountain

On Saturday, 15 June, over a dozen members from across the state converged north of Cody. In a brief business meeting the last ballots were taken for Society office holders and it was decided that next year's annual meeting would be held in the Jack Morrow Hills, Sweetwater County. Then the group drove up Heart Mountain, in its floristic finest for the occasion, to around 6,900 ft. elevation.

Here we left the motorcade and hiked leisurely about a mile, switch backing along the trail through Douglas fir forest with a woody understory dominated (at least below) by Mallow-leaf ninebark (*Physocarpus malvaceus*), to the east summit of Heart Mountain at 8,123 ft. elevation. Along the way on calcareous rock outcroppings and at the treeless summit, the group viewed regional endemics including False saxifrage (*Telesonix heucheriformis*), Kelsey *(Kelseya uniflora*), Shoshonea (Shoshonea pulvinata), Henderson's wavewing (*Cymopterus longilobus*), Columbian virgin's-bower (*Clematis columbiana* var. tenuiloba), and Scented pussytoes (*Antennaria aromatica*). Other low-growing plants of interest in the open, some mat-forming, were Hood's phlox (*Phlox hoodii*), Spiny milkvetch (Astragalus kentrophvta var. tegetarius), Leafy wild parsley (*Musineon divaricatum*), Howard's forget-me-not (*Eritrichium howardii*) and Timber milkvetch (*Astragalus miser* var. *decumbens*), the last in full bloom and quite showy.

Noteworthy along the lower portions of the trail in a relatively rich association were large colonies of Canadian wild violet (*Viola canadensis*) and Rocky Mountain iris (*Iris missouriensis*) while at increasing elevation, it was observed that the ground layer became increasingly depauperate in the forest of now rather stunted Douglas fir. Near the summit a few scattered, stunted individuals of Engelmann spruce *(Picea engelmannii*) and White spruce (*Picea glauca*) were seen. The last named white spruce was peculiar here occurring in dry, exposed situations rather than along stream bottoms and in swamps where it is more often encountered.

An approaching thunderstorm greeted the group at the summit but only amounted to a few drops. The down hill hike was accomplished with considerably more alacrity than the up hill!

Bald Ridge

On Sunday, 16 June, at 8:30 a.m., a group of 8 members gathered at the junction of Wyoming Highways 120 and 296, north of Cody. From here, we drove to the Bald Ridge road on the Shoshone National Forest and then by four-wheel drive vehicles along the ridge to about 7,800 ft. elevation. Along the western escarpment of the ridge, we were offered spectacular views of the surrounding country with Clarks Fork Canyon 4,000 ft. dropping directly below to our north, the Big Horn Basin, Pryor Mountains, and Heart Mountain to our east and the Absaroka and Beartooth Mountains to our west and north.

Along the limestone escarpment rim we found an equally spectacular showing of large populations, most in full bloom, of many of the same regional endemics seen the day before *including Shoshonea pulvinata, Eritrichium howardii, Kelseva uniflora*, and *Antennaria aromatica*. Also in full bloom, but not seen on Heart Mountain, were the regionally endemics Hayden's clover (*Trifolium havdenii*) in exceptionally large floriferous colonies and Jones' columbine (*Aquilegia jonesii*.)

Torrey's four-nerve daisy, on Bald Ridge

In the afternoon, a couple diehards continued hiking along the ridge to the summit of Bald Peak, 8,600 ft. elevation, locating abundant colonies of Sweet-flowered rock-jasmine (Androsace chamaejasme var. carinata) and Torrey's four-nerve-daisy (*Hymenoxvs torreyana*). They managed to get off the ridge before 4 p.m. and thus concluded the 2002 annual meeting. EE

John "Barney" Baxter

John "Barney" Baxter, long-time resident poet, song-writer, and pun-master of the Wyoming Native Plant Society passed away on August 23, 2002 in Ashland, Oregon. John was born on February 4, 1918 in Grover, Colorado, but his family later settled in Laramie County, Wyoming. According to legend (provided by John himself), he was reared near the present-day Antelope Truck Stop in Burns, Wyoming, a site he fondly recalled as being the "home of the giant meatball". Portions of this meatball, he reminisced years later "are still for sale" at the truck stop.

John earned his Bachelor's degree in botany from the University of Wyoming and later took his Master's and PhD in mycology from Purdue University. He served in the Air Force in England during World War II as a member of the 62nd Pursuit Squadron, also known as "Zemke's Wolf Pack". After the war, John taught Botany and Mycology classes as the University of Wyoming, University of Arizona, Iowa State University, and from 1956-1983 at the University of Wisconsin-Milwaukee.

After retirement, John continued to pursue his interest in rusts, smuts, and other fungi and discovered many new species from Wyoming that he described in a series of "totally serious" articles for the Wyoming Native Plant Society newsletter. John may be best known to WNPS members for his witty botanical doggerel and songs that have appeared in the newsletter over the past 10 years. John and his wife Elizabeth left Laramie for warmer climates in Ashland Oregon in 1998, but he continued to provide new poems, songs, and articles for the newsletter from afar.

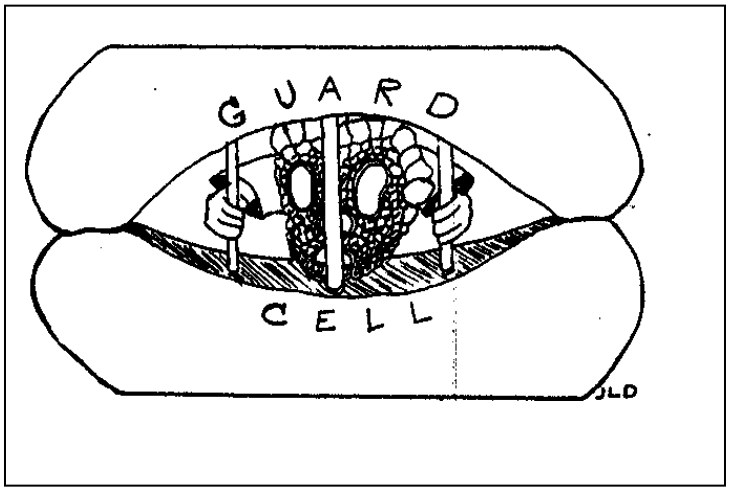
For all his contributions to Wyoming botany and verse, John was bestowed the honorary titles "Bard of Burns (WY)" and "Poet Lariat of Wyoming". As a tribute to John and his legion of groupies, we reprint his first (and still my favorite) feature from the February 1991 issue of the newsletter "Botanical Dragnet". WF

Botanical Dragnet

By John "Barney" Baxter

My name is Joe Friday. I was born in Raceme, Wisconsin. My buddy Spike and I are just umbel cops, but we can go anywhere a catkin, and we always get our man.

It was warm in Los Angeles. It was so warm that Spike and I were beginning to drupe, and we were about to go to Abies bar and get plastid when a call came in that a supermarket had been held up. We drove down there and talked to a checker. She was palea and nervous. "Don't panicle Ma'am," I said, "I just want the FAX." "Well, lemma see," she said, "this guy



Pericycle Pete, by Jane Dorn

came in with a pistil, and I knew he meant to stigma up, so I gave him all the cash. Then I watched him pedicel away on his pericycle. It had one petal missing." I could tell by the style of the caper that it was the work of Pericycle Pete, the notorious supermarket bandit. We spent a week looking for apetalous pericycle, with no success. We were deep in glume. Then one day there was a knock awn the door. "Come in," I said, and who should walk in but Sadie the Shoplifter, a gal whose favorite trick was to Caryophyllaceae bit of feminine apparel from some display counter. "Boys," said Sadie, "I've stolon my last bit of lingerie -- I'm going straight. And to prove I'm Cereus, I'm going to lead you to Pericycle Pete's hangout."

We hoped that Sadie's change of heartwood meant that she wouldn't stele anymore. She took us to Pete's hideout, a sleazy apartment that he had rented from those notorious slumlords, Phil O. Dendron and his wife, Rhoda Dendron. "Culm awn out, Pete," I yelled, "You ought to see the nice nucellus fellows have for you. Yew won't pine away --yew'll spruce up fir a change when you cedar cell."

His only anther was to fire a pistil from a window. We let him rachis with fire for a while, then we broke down the door. He had exhausted his ammunition, and the floor was littered with Brassicaceaes. "Boys," he said, "I'm glad it's over. I lost my shoes, and mitosis cold."

Sadie warned us that the sapwood try to escape, so we took him to the station and locked him up in a guard cell. Later she cracked up, so we sent her to the insane xylem. Then our Irish police chief, Luke O'Plast, gave me a raise* so now I have a funiculus to jingle in my pocket. I also have my name over my office door inflorescence lights, and I feel quite superior ovary the whole thing. --Ament--

*Later the chief was talking promotions. I thought, "Is he Cereus, or is epigynous a curve?" JB

Botanist's Bookshelf

The Botany of Desire by Michael Pollan. 2001. Random House Trade Paperbacks.

It's that time of year again, when the "fruits" of agriculture are hitting the shelves of farm stands and grocery stores across the country. The sheer enormity of this crop production is, to say the least, impressive. Looking out on a vast harvest of corn or potatoes, it is easy to buy into the notion that man, in all his cleverness and with all his technology, has somehow tamed nature, and persuaded plants to do his bidding.

In *The Botany of Desire*, Pollan takes a very different position, arguing that plants are, in fact, the real beneficiaries of human cultivation. Through trial and error, certain plants have hit upon a highly effective means of achieving that most fundamental of biological processes, reproduction. The trick is to be an object of human desire.

It is no secret that plants were taking advantage of animals' cravings for millions of years before man even existed, generating a reward for those which unknowingly provided such services as pollination, seed dispersal, planting, soil aeration, etc. Pollan claims that man is simply another pawn, and that by cultivating selected species, humans are unwittingly providing plants with an irresistible opportunity for propagation on a scale previously unheard of. In this respect, humans are little different from bees, ants, birds, or any other animal that assists in plant reproduction by attempting to satisfy its own passions.

In his words, he "takes the plant's point of view", building his case by selecting four plants that have had enormous impact on human history, and identifying the desires that such plants have evolved to gratify. These desires are sweetness, beauty, intoxication, and control, satiated by the apple, tulip, marijuana, and the humble potato. Those four plants, he states, have something important to teach us about ourselves and our desires.

He goes on to describe each plant with its long history of cultivation and profound influence on human activities. The extent of his investigation of these topics is remarkable. Search for information brought him from his home in Connecticut to the banks of the Ohio River in Ohio, to the potato farms of Idaho, to the marijuana gardens of Holland.

Some of the information that he dredged up in these travels will surprise, or even shock you. For example, consider the legend of John Chapman, otherwise known as Johnny Appleseed. As most school children learn at an early age, this benevolent person traveled barefoot across the eastern and midwestern United States, magnanimously planting apple seeds so that Americans would someday have delicious apples to eat The fallacy that Pollan ruthlessly exposes is that apples grown from seed almost never produce delicious or even reasonably good-tasting apples (a concept that was understood even in the early 1800s). However, they did provide a cider which, when allowed to ferment, became the beverage of choice on the American frontier. Sadly, Mr. Appleseed was not bringing the gift of apples to the wilderness, but the gift of booze, at a time when there were not a lot of other sources. In doing so, he turned a tidy profit and became an established and revered figure in American folklore.

A bit more sobering story is the process of chemical treatment to fields of potatoes grown specifically for McDonald's French fries. The operation consists of a succession of applications of herbicides, insecticides, fertilizers, and other chemicals, some so toxic that farmers won't go near the fields for days after they've been sprayed. Scarier still is the alternative to poisons. Folks at Monsanto Chemical, always thinking of your well-being, have managed to transfer the gene for a powerful insecticide from a common bacterium (*Bacillus thuringiensis*) directly into the potato's DNA. The result is a highly insect-resistant potato that is so genetically modified that, under FDA guidelines, it doesn't even qualify as food. As such, it has never been tested for possible detrimental effects on humans.

Why are people doing these things? Presumably, they are satisfying a passion for enormous quantities of large, delicious, unblemished, McDonalds' French fries. In the process, *Solanum tuberosum* has become an evolutionary winner, merrily reproducing in numbers that never could have been achieved without human intervention.

Fortunately, the stories are generously laced as much with humor as they are with gloom and doom. One particularly amusing situation that comes to mind is Pollan's adventure in which he attempts to grow a crop of large marijuana plants, just outside a dilapidated barn with walls so broken down that they hardly concealed anything inside or out. These plants were near maximum height when Pollan had a truckload of firewood delivered to his place, and both he and the delivery man decided that the barn would be the best place to put it. Conversationally, he asked the man if he sold firewood for a living. The answer: "No, firewood is just a sideline. Nine to five I'm Chief of Police." The events that immediately followed are funny; things could have turned out quite differently.

Pollan's narration is simple and geared to a general public audience. While it superficially comes across as the ramblings of an amateur gardener/naturalist, the information is presented within the context of

(cont. on p. 7, next page)

Aussie in Wyoming

By Sally Madden (salmadden@hotmail.com)

I have just spent the summer (escaping the southern hemisphere winter) working for Wyoming Natural Diversity Database (WYNDD) across southern Wyoming. Some people think I am strange but I actually expressed a preference to work in the basins as opposed to a WYNDD project in Grand Teton NP. But there is a reason for this! Apart from the obvious bear factor, I actually have a passion for harsh, arid and rugged landscapes. They make me feel more at home.

I live and work mostly in Perth, Western Australia. My current position is as a Botanist with a State Planning Agency. I work on a project called "Bush Forever" (which apparently comes from something called "Florida Forever"). "Bush Forever" aims to acquire and reserve 10% of representative vegetation communities within the Perth Metropolitan region – a figure decided upon by the IUCN that is considered to be 'adequate' to conserve ecological communities (although I think it has now been revised at 30%). The project has now been fully endorsed by the Government and is in its implementation phase. Largely what I do is ground-truthing and mapping vegetation and sometimes conduct rare flora surveys – in an effort to protect the best areas.

Prior to that position, I worked as a lab technician studying mating systems of a rare *Banksia* species, which is known from only five isolated populations. I've also worked in other fields from weed and fire ecology to environmental education. This is my first paid job overseas, but I've also participated in volunteer programs in India, the UK and Mauritius (where you ask? Off the coast of Madagascar, south of the Sychelles).

I've had a great time here in Wyoming. I've loved the fieldwork...the sagebrush, the dust, the heat, getting stuck in sand and most importantly, the people I've met. So watch out – I'll be back! SM2

Here are some Australian websites that may be of interest to Wyoming Native Plant Society members:

- The Australian Network for Plant Conservation http://www.anbg.gov.au/anpc/ (they also have a newsletter online called '*Danthonia*')
- The Wildflower Society of Western Australia (our equivalent of the Native Plant Society) http://members.ozemail.com.au/~wildflowers/
- The Australian National Herbarium/Centre for Plant Biodiversity Research (which conducts 8 week internship programs) http://www.anbg.gov.au/cpbr/index.html

Discount on two new *Flora of North America* monocot volumes

Volume 23, The Cyperaceae, and Volume 26, Liliales and Orchidales, are available from the Oxford University Press Publisher for orders placed before December 2002. You can order these volumes now at a discounted $75.00 price, plus $5.00 shipping (compared to a $95.00 price later).

Submit orders via fax #919-677-1303 and use promotion code L113 when ordering.

Botany of Desire – cont. from p. 6

fundamental biological principles including those of genetics, evolution, plant propagation, behavior, psychology, and even a bit of molecular biology. Inextricably tied to the biological aspects that Pollan reports are the historical, cultural, socioeconomic, and political realities that govern human perception and use of plants.

If you are not used to thinking about such concepts as symbiosis and co-evolution, this book will open your eyes. Those who are convinced that man has ultimate control over natural processes will be rudely awakened. People who always suspected that plants were really taking us for a ride will feel vindicated. Regardless of your initial point of view, *The Botany of Desire* will give you a whole new approach to looking at cultivation, and a renewed sense of respect for our relationship with nature. SM

Banksia cuneata
(copyright Australian National Botanic Gardens)
http://www.anbg.gov.au)

Announcing WY BLM sensitive list update

The first annual update of the Bureau of Land Management (BLM) Wyoming sensitive species list has been released. In April 2001, BLM Wyoming issued its first sensitive species list for Public Lands in the state in accordance with BLM Manual 6840 (Special Status Species Management). It is the BLM Wyoming intent to review the list annually as the status of the species change and/or new information is obtained.

Two plant species: Cary's beardtongue (*Penstemon caryi*) and Pale blue-eyed grass (*Sisyrinchium pallidum)* were dropped from the 2001 BLM (WY) Sensitive Species List, leaving 38 plant species on the list for the year 2002. No species were added in the 2002 review. There are a total of 75 plant and animal species on the BLM Wyoming sensitive species list.

Pale blue-eyed grass was dropped from the list because it has been found to be locally abundant, and is also found in Ute ladies'-tresses habitat (a species whose habitat already receives protection under the Endangered Species Act). Cary's beardtongue was dropped due to its populations being more abundant than originally thought. PC

The revised 2002 sensitive species list and criteria may be viewed on-line at:
http://www.wy.blm.gov/wildlife/02species.pdf

Wyoming Native Plant Society
PO Box 3452
Laramie, WY 82071

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 $7.50 annually.

To join or renew, return this form to:

Wyoming Native Plant Society
PO Box 3452
Laramie, WY 82071

Name: _____

Address: _____

_____

___ $7.50 Regular Membership
___ $15.00 Scholarship Supporting Member
($7.50 goes to the annual scholarship fund)