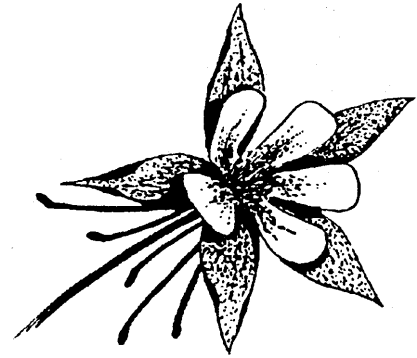


Aquilegia



Newsletter of the Colorado Native Plant Society

“... dedicated to the appreciation and conservation of the Colorado native flora”

Volume 15, Number 5

September/October 1991

Low-elevation Biodiversity

Tim Hogan
University of Colorado Herbarium

During the past several years I have had the good fortune to work on floristic projects in the Eagles Nest/Gore Range Wilderness Area and the City of Boulder Mountain Parks. The Eagles Nest is a 135,000 acre high elevation Wilderness Area that extends from the lower subalpine zone up to tundra-topped peaks of over 13,000 feet. In contrast, the Boulder Mountain Parks is a 7,000 acre montane area that reaches from the plains to 8,000 foot summits. In the course of this work I have had the opportunity to compare a relatively small, low elevation preserve with a large “rock-and-ice wilderness.”

Although the high elevation wilderness is nearly twenty times larger than the low elevation park, it is striking that the same number of species (ca. 400) were documented in each area. Furthermore, at least nine species in the Boulder Mountain Parks are listed by the Colorado Natural Areas Program as Species of Special Concern. These include *Betula papyrifera*, *Botrypus virginianus*, *Cylactis pubescens*, *Lilium philadelphicum*, *Listera convallarioides*, *Malaxis monophyllos*, *Pyrola picta*, *Smilax lasioneura*, and *Viola pedatifida*. Although my work in the Eagles Nest helped to fill a void in our records at the

University of Colorado Herbarium, the most remarkable result of that work was how typical the flora of that Wilderness Area is in relation to other alpine regions in the state.

There is a great deal of talk these days about the preservation of biodiversity. In employing this term, conservation biologists are attempting to embrace the full diversity of life: not just the diversity of species numbers, but also the genetic diversity within and among populations, and the ecosystem diversity across landscapes. Nevertheless, species numbers often serve as a useful indicator of biodiversity in the broader sense. For this reason alone, the results from the two floristic projects indicate that the smaller, low elevation study area serves

a conservation role disproportionate to its size.

Another reason that low elevation sites in Colorado are important for the preservation of our native species is their significance for animal populations. Many animal species are limited by bottlenecks in the annual cycle—times when their food is limited or shelter from the elements is most precarious. Low elevation natural areas often provide the habitat these species need to survive the rigors of cold, drought, and famine. As botanists we do not need to be reminded that our floral riches are often as dependent on pollinators and animal dispersal as they are on water and soil.

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Denver Chapter Meetings

Come greet friends and help us get the meeting year started!

Oct. 23rd: Bring slides of your favorite plants or plant places from summer's explorations. Classroom A.

Dec. 11th: Compromise Nov-Dec meeting. Dr. Paul Kilburn, who has taught botany and ecology in Colorado, will present a program on either North Table Mountain or the alpine tundra. Classroom C.

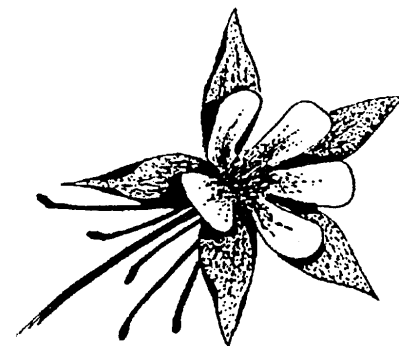
Jan. 22nd: Dr. Ron Sanford, academic coordinator of the program for ecologi-

cal studies at Colorado State University, will discuss his research in tropical rainforests. Classroom C.

Feb. 26th: Tina Jones, regional naturalist, will present the Natural History of Aspens. Classroom C.

All meetings this year will be held at the **Denver Botanic Gardens at 7:30 p.m.** unless otherwise announced. Meetings are generally held on the last Wednesday of the month. Contact Carol Dawson, 722-6758, for meeting information.

We look forward to seeing you soon!



**Aquilegia is printed on
100% recycled paper**

Aquilegia

Aquilegia is published six times per year by the Colorado Native Plant Society. This newsletter is available to members of the Society and others with an interest in native plants. Contact the Society for subscription information.

Articles from *Aquilegia* may be used by other native plant societies if fully cited to author and attributed to *Aquilegia*.

The Colorado Native Plant Society is a non-profit organization dedicated to the appreciation and conservation of the Colorado native flora. Membership is open to all with an interest in our native plants, and is composed of plant enthusiasts, both professional and non-professional.

Please join us in helping to encourage interest in enjoying and protecting the variety of native plants in Colorado. The Society sponsors field trips, workshops and other activities through local chapters and statewide. Contact the Society or a chapter representative or committee chair for more information.

Schedule of Membership Fees

Life	\$250.00
Supporting	\$ 50.00
Organization	\$ 25.00
Family or Dual	\$ 12.00
Individual	\$ 8.00
Student or Senior	\$ 4.00

Membership Renewals/Information

Please direct all membership applications, renewals and address changes to the Membership chairperson, in care of the Society's mailing address. Please direct all other inquiries regarding the Society to the Secretary in care of the Society's mailing address.

Newsletter Contributions

Please direct all contributions to the newsletter to:

Peter Root
4915 West 31st Avenue
Denver, CO 80212

Deadlines for newsletter materials are February 15, April 15, June 15, August 15, October 15 and December 15.

Short items such as unusual information about a plant, a little known botanical term, etc. are especially welcome. Camera-ready line art or other illustrations are also solicited.

Please include author's name and address, although items will be printed anonymously if requested. Articles may be submitted on disks (IBM-compatible, 5.25-in. DS/DD) if desired; please indicate word processing software and version used.

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Workshops	Bill Jennings	666-8348

Announcements

Natural Areas in the Western Landscape

The 18th annual natural areas conference will be held in Estes Park Oct. 15-18, 1991. The Natural Areas Association's first national meeting in the Rocky Mountain West will discuss conservation of natural diversity on public lands in the West, and will include sessions on riparian restoration, livestock grazing and natural diversity, the Colorado Natural Areas Program, rare plant management, and Greater Ecosystem/Biosphere Reserve Management.

On Thursday, Oct. 17th, five full-day and one half-day field trips will be offered. Locations include Specimen Mtn./Horseshoe Park/Trail Ridge Road, in Rocky Mtn. Natl. Park; Lawn Lake alluvial fan/Geology of Rocky Mtn. Natl. Park; Copeland Willow Carr/Wild Basin; Owl Canyon Pinyon Grove/Phantom Canyon Preserve/

Poudre River; Pawnee National Grasslands; and the Colorado Tallgrass Prairie Natural Area in Boulder Co.

Registration for the conference is \$50 per person and includes field trip transportation.

For more information, contact Brooke Wineteer at (303)444-1060.

Lodging is available directly through the YMCA of the Rockies, 2515 Tunnel Road, Estes Park, CO 80511-2550; phone (303)586-3341 or (303)623-9215 (metro).

With regret . . .

We report the recent deaths of longtime friends of the Colorado Native Plant Society, Marjorie Shepherd of Denver and George Kelly of Cortez, Colorado.

Metro-area members may fondly recall chapter outings and plant hunting at the Shepherd cabin near Bailey.

George Kelly is well known to Society members for his lifelong enthusiasm for Colorado plants.

Their contributions will be missed.

Ferrets in Little Snake?

The BLM is proposing to amend the Little Snake Resource Management Plan because of a proposed reintroduction of black-footed ferrets. Ferrets would be reintroduced into northwestern Moffat County, Colorado, as a non-essential experimental population. The environmental assessment and plan modifications would determine what restrictions on other resources will be necessary and what effects such restrictions will have on other uses of the Little Snake Resource Area.

The planning criterion for amending the management plan is "to establish a management objective which provides for black-footed ferret reintroduction while not adversely impacting other resources or uses." BLM has identified the following general issues to be addressed: access to public lands,

economic and social conditions, threatened and endangered species, rangeland uses, recreation uses, wildlife habitat management, mineral exploration and development, and public rights-of-way.

BLM requests interested or affected parties to participate in this process by sending their specific comments for receipt by October 11, 1991. Comments may address issues above, effects on resources, and/or raise additional issues to be considered in the amendment process.

Address comments to:

Mike Albee, Project Coordinator
Bureau of Land Management
1280 Industrial Ave.
Craig, CO 81625

Brome Reminder

If you have information about the naturalization of smooth brome, it's not too late to contact Gary Finstad, who is compiling it for the Society and has received few direct responses to date.

Gary is even willing to discuss general observations and opinions, as well as any facts and locations you can provide. You can reach him at 236-2702 (days) or 791-3790 (eves).



The First Collection of *Spiranthes diluvialis*

William A. Weber
University of Colorado Herbarium

Harold Dahnke was rummaging around in the COLO herbarium recently and found a specimen of *Alisma triviale* collected in Boulder County wetlands just west of Baseline Lake by Joe Ewan in 1941. This in itself is not surprising. But Ewan had noted on the label that it was growing, among other plants, with *Spiranthes*. This had to be *S. diluvialis*. However, we could not find any specimen of a *Spiranthes* collected by him. The *Alisma* must have been a specimen left behind when Joe took his large personal herbarium with him when he left the University. We wondered whether Joe merely saw the orchid or whether he might have collected a specimen.

I wrote immediately to Joe, who has retired and is now at the Missouri Botanical Garden, and asked him if his field notes might tell us whether there was a specimen collected. I did not get a reply directly, but I heard very quickly from the curator of the herbarium at Tulane University, who sent me a copy of the pertinent page from Joe's field notes, and a photocopy of the actual specimen, which is at Tulane with the rest of the Ewan Herbarium. And, of course, it is *Spiranthes diluvialis*, collected almost 45 years before the species was discovered and described in 1984!

Maybe there is a moral to the story, or a lesson, or something. When we work on the floristic level, Colorado collections in other herbaria are almost impossible to learn about. It would be helpful if collectors of the Colorado Flora would pass their collections through the herbarium of record where new records might be noted. Joe Ewan took his herbarium with him before there was a real herbarium of record here, and had he left his herbarium in Boulder, there is no guarantee that it would have been safe. Likewise, the huge collection made by Francis Potter Daniels on which he based his book, the *Flora of Boulder*

County, is in the University of Missouri herbarium, with a partial set in Field Museum. When I first worked on the Boulder County flora, I had to borrow the entire collection from Missouri, and several critical specimens could not be found.

The situation is different now; the herbarium is safe, the flora is under serious study by numbers of people concerned with records, and a comprehensive catalog is about to be published. But still there are those collectors who evidently treasure their private collections more than they do the science to which the collections might contribute.

Time and again someone tells me that such and such a species grows in Kiowa or Logan County, and why don't I say so in my handbooks? The answer is, of course, that unless it is in the herbarium, it doesn't exist, because at the present time our published statements have to be based on fact. I hope that we soon will see the day when sight records of at least common and easily recognized plants will be acceptable as herbarium records, just as they are in ornithology, but a generation of good field botanists must be trained to the task before it happens. Meanwhile, in every state of the union, plant collectors should, as a matter of scientific method, see to it that their collections are at least offered to the herbarium of record, even if only one or two might be retained there. ♣

Nancy Chew, of the USFWS Regional Office, reports (as of Sept. 26) that she is preparing the *Spiranthes* listing package for legal adequacy review by the Regional Solicitor's office. She an-

Plant Protection in Colorado

from Colorado Revised Statutes

24-80-905. Columbine. The white and lavender columbine is hereby made and declared to be the state flower of the state of Colorado.

24-80-906. Duty to protect. It is hereby declared to be the duty of all citizens of this state to protect the white and lavender Columbine *Aquilegia*, *Caerulea* [sic], the state flower, from needless destruction or waste.

24-80-0-7. Limitation on picking state flower. It is unlawful for any person to tear the state flower up by the roots when grown or growing upon any state, school, or other public lands or in any public highway or other public place or to pick or gather upon any such public lands or in any such public highway or place more than twenty-five stems, buds, or blossoms of such flower in any one day; and it is also unlawful for any person to pick or gather such flower upon private lands without the consent of the owner thereof first had or obtained.

24-80-908. Violation a misdemeanor - penalty. Any person who violates any provision of section 24-80-907 is guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not less than five nor more than fifty dollars.

Spiranthes Status Update

ticipates that the package will be sent on to Washington, D.C., by the end of October. Statutory deadline for listing is Nov 13, one year from publication of the proposed listing notice.

COLORADO MENTZELIAS (BARTONIA SECTION)

Species	Petals			Seeds			Chrm. #	Plant height	Leaf		Bract	Capsule		Notes	
	color	pub.	#	length	width	wing			coat	pap.		margin	rachis		shape
decapetala	W	F	10	40-80	M	N	S	F	11	1000	W	P	C	30-45	A, B
nuda	W	F	10	15-40	M	W	S	F	10	1000	W	P	C	14-30	C
rusbyi	W	F	10	15-20	M	W	W	M	10	500	W	P	C	15-30	
albescens	S	F	10	6-11	M	W	S	F	11	800	W	--	C	20-30	D
multiflora	Y-S	F	5/10	7-25	M	M	W	M	9	800	W	E	C-cup	8-24	D
laevicaulis	Y	F	5	30-60	M	W	S	F	11	1000	W	E-P	C	35-53	A, C, E
paradoxica *	Y	F	10	17	M	W	W	M	--	---	L	--	---	---	F
argillosa	Y	F	5	5-23	M	N	S	F	11	300	W	E	T-U	8-10	
multicaulis	Y	F	5	9-10	W	N	S	I	11	---	L	E	U	10-15	E
sanjuanensis *	YO	F	5	---	M	N	W	M	9	---	T	--	---	---	
pterosperma	Y	F	10	9-15	M	W	S	M	--	---	T	--	U	9-14	
speciosa *	YO	F	10	---	M	W	S	F	10	---	W	--	---	---	
sinuata	YO	F	10	---	M	W	S	F	9	---	W	--	---	---	
reverchonii	Y	F	10	15-30	M	W	S	I	9	1000	W	--	---	---	
pumila	Y	F	10	9-15	M	M	S	F	11	600	W	E	U-C	15-20	
densa	YO	F	10	16-18	M	M	S	M	10	---	W	--	C	---	G
chrysantha	YO	F	10	25	M	M	S	M	10	---	T	E	C	---	
lacinata	YO	F	10	16-18	W	N	W	M	10	---	L	--	---	---	
cronquistii	Y	T	10	7-15	M	M	S	M	10	400	N	E	cup	6-13	H
marginata	Y	T	5	10-13	M	M	S	M	--	300	W	E	C-cup	8-12	

CHART ABBREVIATIONS:

Species: * indicates that the species has not yet received an officially approved botanical name. M. humilis has been reported, but not confirmed.

Petal Color: S → straw or yellowish white, W → white, Y → yellow, YO → yellow-orange or golden yellow.

Petal pubescence: F → fine, T → thick.

Petal #: A staminode with a wide filament, and without an anther or node at its tip, is counted as a petal.

Petal length, Plant height, and Capsule length: Length and height are given in millimeters.

Petal width and Seed wing width: M → moderate, N → narrow, W → wide.

Seed coat radial walls: S → straight, W → wavy.

Seed papillae — within each cell on the seed wall: F → few papillae, I → intermediate number, M → many papillae.

Leaf margin: C → crenate, E → entire, L → lobed, T → toothed.

Leaf rachis: N → narrow, W → wide.

Bract: E → entire margin, P → pectinate margin.

Capsule shape: C → cylindrical, cup → cup shaped, G → globular, T → turbinate, U → urceolate.

Notes: A → M. decapetala and M. laevicaulis hybridize in their overlap regions; B → bracts adnate with capsule; C → bracts not adnate with capsule; D → Specimens of other species are frequently identified incorrectly as being M. multiflora. The wavy margins of the walls around each cell on the seed coat are a distinguishing characteristic; E → flower head also has 5 staminodes; F → flower head also has 5 or more staminodes; G → Federal threatened or endangered plant species; H → The stem is pink under exfoliating epidermis.

Biodiversity, *continued from page 1*

The current wilderness legislation in Congress fails to protect many low elevation areas deserving of designation. It is easier for politicians to set aside areas poor in water, timber, and mineral resources than it is to defend biologically rich wilderness. Areas such as Kannah Creek, middle and lower Sandbench, Troublesome, Ute Creek, additions to the South San Juans, and the Rainbow Trail on the east slopes of the Sangre de Cristos are neglected under the current wilderness proposal. I have taken two wonderful backpack trips along the crest of the Sangres this summer, and I am happy that this area is slated for wilderness designation. But if alpine environments are to retain their ecological integrity and not be turned into islands in the sky, they must also be protected along their flanks and shoulders.

As members of the Native Plant Society we can play an active role in the preservation of natural areas in Colorado. As a collective voice, we possess a legitimacy to which policy makers will respond. As individuals who are intimate with unspoiled places throughout the state, we are in a position to identify these areas and speak out when they are threatened. Sometimes these will be large areas nominated for wilderness designation. With the upcoming BLM Wilderness Proposal, this will be of critical importance in the near future. At other times the areas will be more modest in size, but still of critical importance. Perhaps we are all somewhat culpable for the lack of low elevation sites under wilderness protection; we have not done a good enough job in educating our elected officials and fellow citizens of their ecological and evolutionary significance.

I chose to work in the Eagles Nest Wilderness because of my abiding love for high places, perennial snowfields, sweeping rock, glaciated topography, and alpine forget-me-nots. My appreciation for softer, more subtle landscapes has developed more slowly. I remember eating my lunch one day in a small drainage on the northwest side of Green Mountain in the Boulder

Mountain Parks. It was cool beneath the mixed forest and the silence was only exaggerated by a small stream in the bottom and the occasional call of a kinglet. I realized that a change had occurred in my perception and that my measure of beauty was no longer restricted to alpine landscapes. Beauty had been expanded for me, and the summits of my youth would no longer be complete without the forests, woodlands, and meadows that I had only come to know through the slow and patient botanizing of these environs.



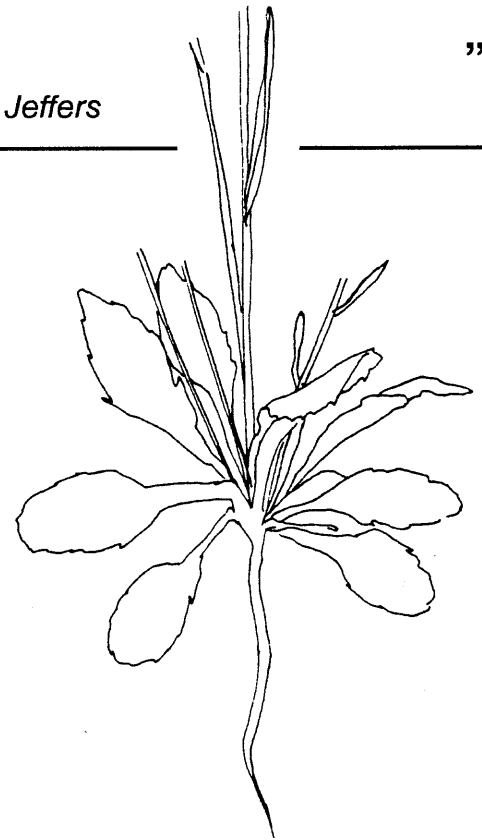
“

... Integrity is wholeness, the greatest beauty is organic wholeness, the wholeness of life and things, the divine beauty of the universe. Love that, not man apart from that ...

—Robinson Jeffers

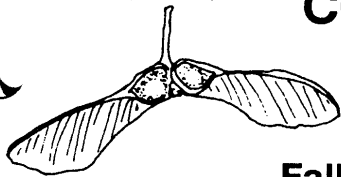
”

We are living at a critical point in history. Human population growth and our impact on the earth must be addressed if the massive assault on species, landscapes, and traditional cultures is to be slowed. The Colorado Native Plant Society and its members have both the expertise and the responsibility to speak out for the preservation of specific sites and the overall diversity of life on the planet. ♣



Campanula rotundifolia

CONPS Workshops – 1991-1992 Season



Fall and Winter Workshops



Botanical Illustration II Saturday, October 12, 1991



Leader: Carolyn Crawford

Our first workshop on Botanical Illustration proved so popular, Carolyn Crawford has agreed to present a more advanced workshop. Drawing and dissection of fall fruits will be the emphasis of this workshop. Fruits of *Vitus*, *Parthenocissus*, *Smilax*, *Crataegus*, *Malus*, etc., will be available to draw.

In addition to the techniques of colored pencil and pen & ink, Carolyn will demonstrate her main medium, pastel pencil. It is planned to have a guest instructor present watercolor techniques as well, but this is not confirmed.

To be held at Foothills Nature Center, Boulder.

Orchids of Colorado Saturday, December 7, 1991

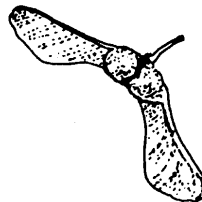
Bill Jennings

As currently understood, there are 24 species of orchids native to Colorado, with three more known from within 75 miles of the state line in Nebraska or New Mexico. Although the identification of most Colorado species is straightforward, the bog orchid group (genus *Limnorchis*, also known as *Platanthera* or *Habenaria*) is very complicated and agreement between

taxonomists is non-existent. In temperate North America, orchids are nowhere common and numerous very rare species are in the family. Best known for showy flowers from tropical plants, many Colorado species are instead rather drab.

To be held at the Denver Botanic Gardens, Denver.

Genus *Draba* in Colorado Saturday, January 11, 1992



Leader: Dr. Robert Price

The Colorado Native Plant Society is fortunate to be able to bring Dr. Price back to Colorado to present this workshop. A Colorado native, his early work in genus *Draba* was done in Colorado. Now at Indiana University, he will present the latest research in this interesting genus in the mustard family (Brassicaceae).

A special lecture will be presented Friday night, January 10, at a location to be determined. If demand is sufficient, a second section of the workshop will be held Sunday, January 12.

Workshop to be held at the University of Colorado, Boulder (special thanks to Tom Ranker).

Registration for Workshops

Please mail in your registration this year. Jot down the workshops for which you wish to register, include your name, address and phone number, and send the note to: **Bill Jennings, PO Box 952, Louisville, CO 80027**. Be sure to include your mailing address and phone number if you mail in your registration. Registration order will be first come, first served, by the date on your letter, or postmark if no date is included.

Please register promptly, as workshops tend to fill up fast. If demand is sufficient, multiple sessions will be scheduled if the instructor is willing. Registrants will be notified by mail about two weeks before the workshop regarding session date, location, lunch, supplies, suggested references, etc.

Unless otherwise noted, the fee for each full-day workshop is \$8 for members and \$16 for non-members (\$8 for membership and \$8 for the workshop). Please hold payments until the day of the workshop.

Additional workshops tentatively scheduled for winter 1992 include

Montane and Subalpine Grasses

Genus *Astragalus* in Colorado

Colorado Ferns

Taxonomy and Cultivation of Native North American Rhododendrons

Adopt-a-Rare-Plant Workshop.

As plans are confirmed, winter workshops will be announced in later issues of *Aquilegia*. ♣

Exotic Tree Willows in Colorado: Thoughts on the Reproductive Ecology of Crack and White Willows

Pat Shafroth, Jonathan Friedman, and Mike Scott

Anyone who has walked, jogged, or biked along a stream that drains the Front Range has probably passed sizable willow (*Salix* sp.) trees. Two large tree willows in our area are the crack or brittle willow (*Salix fragilis*) and the white willow or golden osier (*Salix alba* var. *vitellina*). Both species attain considerable size, often greater than 40 feet in height and 3 feet in diameter.

Crack willow, the more common of the two, can be distinguished from white willow by its smooth, ascending, olive-green branches. White willow has golden yellow twigs and brownish yellow branches. Also, the branches and twigs of crack willow are very brittle at the base; hence its common name. Both of these species are introduced, and some claim that what we refer to as crack willow is actually a hybrid between *S. fragilis* and *S. alba*. Peachleaf willow (*S. amygdaloides*) is a native tree willow that grows in similar habitats, but has a smaller stature than crack or white willow, rarely exceeding 40 feet. Other exotic tree willows that might occasionally occur in riparian areas are the weeping willow (*S. babylonica*) and the globe willow (*S. matsudana*).

Natives of Eurasia, crack and white willows were introduced to colonial America where they were used as fast growing sources of shade, timber, gunpowder charcoal, basket withes, and also for erosion control and windbreaks. They have become naturalized in most of southeastern Canada and the eastern U.S. Presumably crack and white willows were brought to Colorado by settlers in the late 1800's. The oldest trees occur near long-established cities, towns, ranches, and farm houses. In fact, large crack willows are often the most prominent remnants of abandoned homesteads. The species apparently escaped cultivation and became successfully established along reaches of rivers and irrigation ditches. Crack willow was either more widely planted or has reproduced more successfully than white willow, as it is more abundant in our state.

This May we noticed that all of the crack willows in a reach along Boulder Creek bore female catkins, while all of the white willows bore male catkins. The scarcity of male crack willows in North America was previously noted by H. D. Harrington in *Manual of the Plants of Colorado* and by R. A. Vines in *Trees of East Texas*. We decided to survey several reaches along some of the major Front Range drainages (Boulder Creek, Cache la Poudre River, Cherry Creek, South Platte River, Plum Creek) in an effort to verify this curious phenomenon. Of 2320 crack willows surveyed, we found only 3 males, and of 152 white willows, we found only 2 females. In addition, we found apparent hybrids of both sexes along sections of Plum Creek, Cherry Creek and the Cache la Poudre River.

Our findings prompted us to hypothesize about the reproductive ecology of these species, especially crack willow. The extremely skewed sex ratios and apparent absence of very small individuals led us to believe that crack willow is reproducing primarily vegetatively. Along Plum Creek near the town of Sedalia, lone crack willows typically punctuate the upstream ends of depositional bars in the stream channel. Apparently, branches that have cracked off larger trees have become lodged and rooted in the sandy channel, later trapping sediment and helping form bars.

Along Cherry Creek in southeast Denver, young crack willows are present on the edges (especially upstream) of small rock check dams. These trees may have arisen from branches that were stopped in the check dam backwaters. Other authors have noted crack willow's ability to reproduce from fallen branches and twigs (e.g., *The Complete Guide to Trees of Britain and Northern Europe* by A. Mitchell, and *Some American Trees* by W. B. Werthner).

We remained puzzled about why crack willows are apparently rarely reproducing by seed. We reasoned that, since there are so few males, the females are

rarely pollinated, and therefore the seed is almost entirely sterile, or aborts. In fact, we found an average of 2.95 seeds per capsule in a sample of 20 catkins collected along the Cache la Poudre River. To our surprise, more than 87% of 1000 seeds germinated in petri dishes. Because we collected many of the catkins from stands of purely female individuals, we feel that crack willow may be forming seed apomictically; that is, producing viable seed without fertilization. Alternatively, female trees may simply be receiving pollen from some relatively nearby male white or crack willows.

Crack willows may occasionally become established from seed, but apparently the conditions necessary for their establishment and survival are almost never met. Genetic defects could also inhibit the survival of crack willow seedlings. However, seedlings that we planted in wet sand in early June are now (mid-August) 3-5 cm tall and experiencing low mortality. We hope to conduct experiments in the future to identify what factors are preventing more widespread seed reproduction.

Clearly, many questions regarding crack willow reproductive ecology remain unanswered. Our speculations and conclusions are based on limited observations. We welcome any information CONPS members may have on the history of crack and white willows in Colorado, or the locations of male crack willows, female white willows, or hybrids. Only through more observation and experimentation will we be able to unravel this interesting botanical story. Please send any correspondence to:

Pat Shafroth or Mike Scott
US Dept of the Interior
FWS National Ecology Research Ctr
Riverine and Wetland
Ecosystems Branch
4512 McMurray Ave.
Fort Collins, CO 80521-3400

1991 Annual Meeting Reminder

Plan now to attend the Society's annual meeting, November 2nd at the Denver Museum of Natural History (DMNH). This exciting program explores one of our most threatened, and most neglected, vegetation types—the North American prairie.

The destruction and loss of diversity now occurring in the tropical rainforests parallels the history of North America during the development and conquest of our native grasslands. Speakers will go beyond botanical emphasis to explore the relationships among plant communities, animals, and the early and modern human inhabitants of the prairies of the United States. An overall historical viewpoint will lend the program a sense of how sweeping changes occurred to this once-vast biome, and how we can help protect and restore the ecosystems of the Great Plains.

The Denver Museum of Natural History is co-sponsoring this discussion of the grassland ecosystems that are an important part of Colorado's history—and its future.

Program

- 8:00 Registration**
- 8:45 Opening Remarks:**
Gayle Weinstein, president
- 9:00 History of the Grasslands**
Jane Bock
- 9:45 Mammalian Life on the Prairie**
David Armstrong
- 10:30 Break**
- 10:45 Human Influences on the Grasslands:** Joyce Herald, Dean Kanode
- 11:45 Annual Meeting Brief**
(voting for Board and bylaws)
- 12:00 Lunch, Board meeting**
Self-guided tour of DMNH Colorado Ecosystems dioramas
- 1:15 Introduction of New Board**
- 1:30 Loss of Community**
Ed Gerrant
- 2:30 Restoration and Preservation of the Grasslands**
Bill Floyd, Floyd Reed
- 3:30 Adjournment**

About the Speakers

Jane Bock, professor of Environmental, Population, & Organismic Biology at the University of Colorado, Boulder, is a botanist with particular interest in the role plants play in our day-to-day lives.

David Armstrong, professor and director of the CU Museum, is an expert in ecology of western North America and the effect of humans on native ecosystems.

Joyce Herald is a staff member in the Anthropology Dept. at the Denver Museum of Natural History.

Dean Kanode, president of the Crow Valley Livestock Cooperative, works with the Forest Service in long-range planning in the Pawnee Grasslands area.

Ed Gerrant is currently conservation director and curator of the seed bank for rare and endangered plants of the Pacific Northwest at Berry Botanic Gardens in Portland, Oregon.

Bill Floyd was recently appointed USFS district ranger for Pawnee National Grasslands.

Floyd Reed is a range management specialist, presently range staff officer of Pike-San Isabel National Forest.



The Search for Rare Plants

Bill Jennings

Some information on rare plants from the summer of 1991 has already been received. As the Adopt-A-Rare-Plant volunteers conclude their studies, there will be more reports on Colorado rare plants.

Limnorchis ensifolia (*Limnorchis sparsiflora sensu lato*)

We can now add Chaffee County to the list of counties where sparsely-flowered bog orchid occurs. A small population was seen on private land near Buena Vista in early August. The landowner was interested in selling his holdings to The Nature Conservancy. Both Rick Brune and I had checked the property.

Unmounted specimens seen at RM indicate the presence of this orchid in the Flat Tops area, probably Garfield County.

Epipactis gigantea

As predicted, this orchid has finally been discovered in the seeps along the Dolores River. There is a line of seeps at the Wingate/Chinle contact on the east side of Sewemup Mesa in the Dolores River Canyon. Many of these seeps are accessible to those willing to do some climbing, but there is one right at roadside about 16 miles north of Uravan. A large pullout with trash cans marks the spot. Underneath an overhang, there are a few plants of maiden-hair fern. However, as one walks upstream along the road, the seep line gains altitude quickly. About 150 paces up the road, the seep line is about 30 feet up the cliff. It is at this point that the orchid was observed. The climb up to the plants is not particularly difficult.

Erigeron kachinensis

This diminutive daisy is in the same seep as the *Epipactis gigantea*. There are plants next to the orchid, but there is one clump lower on the cliff, so that it can be accessed by climbing up only one ledge, about 6 to 8 feet above road level. In addition, more plants were seen in a less accessible spot, a few hundred feet further upstream. Some climbing is neces-

sary to get to this location, as the seep is getting further up the cliff as one goes upstream.

Other sites for Kachina daisy are in Bull Canyon and Coyote Wash, tributaries of the Dolores River, in Slick Rock Canyon. There is no road along the Dolores in this part of the canyon. In the past, dirt and gravel roads made these sites relatively accessible, but with the cessation of uranium mining in the area, neither the BLM nor Montrose County is maintaining these roads, and they have washed out. Lengthy hikes are now necessary to access this portion of the Dolores. The BLM has signs in the area that Slick Rock Canyon is under study as a wilderness area.

Listera borealis

Two new sites were discovered this year. Sandy Righter found this little orchid on the Two Elk Pass Trail, near Vail in Eagle County on July 14. This is the first report for Eagle County. I found northern twayblade in Larimer County, north of Chambers Lake in the Laramie River drainage, visiting the site June 22, July 3, and July 10. At this site, all three Colorado species of *Listera* grow together. This is the first report for Larimer County. There are now eleven sites in nine counties.

Listera convallarioides

This little twayblade was found growing with the other two species of *Listera* in a roadside seep north of Chambers Lake. Although previously known from Larimer County (Rocky Mountain National Park), this new site increases the number of known Colorado populations to five. Other colonies are in Boulder and Routt Counties.

A literature report for this species was investigated by Dr. William A. Weber. A specimen housed in the Herbarium Boissier, Geneva, collected in Colorado during the 1890's was reported to be *Listera convallarioides*, but a photocopy of the specimen conclusively showed it to be the common *Listera cordata*.

Cypripedium fasciculatum

Funding by the USDA Forest Service this year enabled me to study this plant. Populations in Rocky Mountain National Park, near Glendevy in the Laramie River area, on the east side of the Park Range near Buffalo Pass, south of Rabbit Ears Pass, and near Grand Lake were recovered. The population near Buffalo Pass had an estimated 1000 plants, nearly all in bloom. Sandy Righter found two previously undocumented populations, based on reports by Diana Mullineaux and Mary Ellen Gilliland. These sites are in Eagle and Summit Counties. Sandy also located a new population in Eagle County last year. This orchid is known from 16 sites in Jackson, Larimer, Boulder, Routt, Grand, Summit, and Eagle Counties. Based on literature reports, it may be more common in Colorado than anywhere else in its range.

Lilium philadelphicum

I also studied this species with funds from the Forest Service. Historically, most specimens of this plant have been taken in Larimer, Boulder, and Jefferson Counties. However, most specimens are very old and label data are scanty. I found no plants at most documented sites, but I heard of numerous populations through the grapevine. It appears that most existing populations of wood lily are given de facto protection by being on private land and thus inaccessible to the general public. There are sites in the National Forest west of Fort Collins; north of Nederland; and south of Sedalia.

This plant is so showy it attracts immediate attention and is frequently picked or transplanted. At one site on public land, a woman was observed with a bouquet of flowers that included the lily. Close examination of that lily patch indicated both picking and trampling. Although there are numerous populations in northern Colorado, all patches examined were less than 150 plants, typically about 50 to 75. It should never be picked.

Smilax lasioneura

Carolyn Crawford has adopted this plant. It appears to be particularly numerous near Boulder. Plants were seen in Long Canyon, Gregory Canyon, Bluebell Canyon, along Skunk Creek, in Shadow Canyon, and along South Boulder Creek. In Jefferson County, a site collected by William A. Weber during the 1960's was recovered. Plants in South Cheyenne Canyon, Colorado Springs (called to our attention by Lee Barzee) were also seen. Plants were sought, but not found, in Jarre Canyon southwest of Sedalia; in Waterton Canyon (South Platte River); in Buckhorn Canyon (Larimer County; and Rist Canyon.

Viola pedatifida

The bird's-foot violet attracted a lot of attention this year. Both Bob Powell and Anne Maley adopted it as part of the Adopt-A-Rare-Plant Program. Bob found plants along the Mesa Trail, between Boulder and Eldorado Springs. Anne found a very large population on the Dakota Hogback north of Lee Hill Road. Some of the plants are in the area burned during the fall of 1990. In addition Anne found plants in the Rampart Range, southwest of Sedalia, and in the Black Forest, northwest of Colorado Springs. Violets are not well understood in Colorado, and much more information is desired. Even the relatively common species should be adopted.

"*Vaccinium globulare*"

This species has been consistently reported for the Park Range, near Steamboat Springs. Dr. William A. Weber, writing in *Colorado Flora: Western Slope* says: "What seems to be this species occurs in the Park Range, but it has not been collected in flower or fruit. It looks like a gigantic form of *Vaccinium myrtilus*, but needs further study in the field."

A specimen collected by Jane Bunin on July 13, 1973, has been the center of the controversy surrounding this plant. Jo Ann Flock and I had sought the colony without success. Armed with a map provided by Jane Bunin, I rediscovered the plants on June 23, 1991. Slightly less

than one mile east-southeast of Fish Creek Falls on the Long Lake Trail (trail 1102), there are four very large and apparently very old blueberry plants with woody stems as large as a pencil. Both very large leaves and normal-sized leaves were seen on the same plants. New growth leaves were larger than leaves emerging from old growth. I concluded that these are just old, large *Vaccinium myrtilus*.

On specimens of *Vaccinium membranaceum* (*V. globulare* is considered synonymous with this species by most modern workers) seen at BYU, the leaf serrations were pronounced and very regular, like a hacksaw blade. On all specimens and live plants of *Vaccinium myrtilus* seen, serrations are less regular and more subdued.

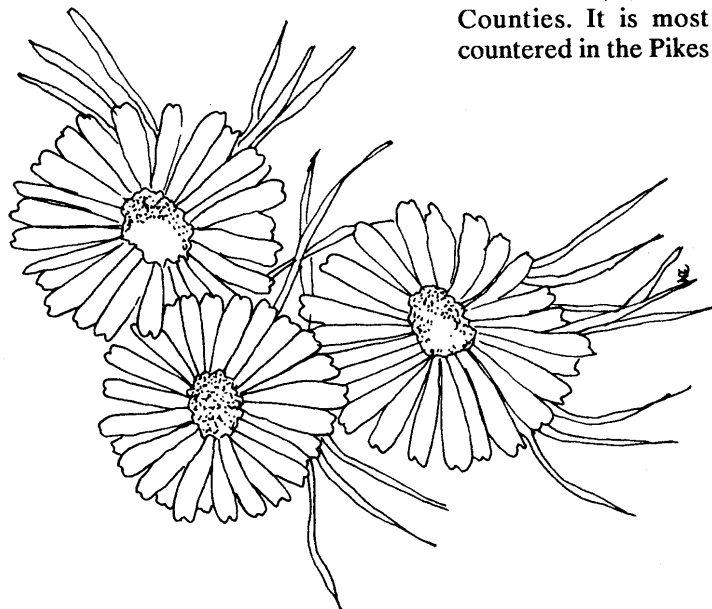
Vaccinium membranaceum is a northwestern species reaching its southeastern limit in northern Utah. There is nothing remarkable about the location along Long Lake Trail with regard to associated northwestern species. *Trillium ovatum*, *Rhododendron albiflorum*, *Mimulus lewisii*, and *Cypripedium fasciculatum* were not seen in the area. In my opinion, specimens of large-leaved blueberries attributed to northwestern taxa are most likely *Vaccinium myrtilus* responding robustly to improved moisture and growing conditions.

Eustoma grandiflorum

Jim Borland and Ed & Jean Dubois both called my attention to a nice colony of prairie gentain growing along I-25 north of St. Vrain Creek. With the landowner's permission, numerous plants were seen, some with almost white flowers. The area is somewhat disturbed, with Russian Olives and an irrigation system present. This site is in Weld County.

Goodyera repens

Study of this little cousin to orchid *Goodyera oblongifolia* was funded by the Forest Service in 1991. *Goodyera repens* is circumboreal, but in the western United States, there are scattered populations south of its main range across Canada and the Northeast. There are a few sites in Montana and in the Black Hills of South Dakota, but none are known in Idaho, Wyoming, Utah, or Nevada. In Colorado it is found from the Squaw Pass area southward into New Mexico, with a few populations high in the mountains of southeastern Arizona, usually on cool north-facing slopes, often in little draws that attract moisture, but not enough to actually develop into a flowing stream. Three sites were recovered, including the Squaw Pass site. A new population was discovered in the Wet Mountains southwest of Pueblo. Betsy Neely found two populations in Las Animas County in 1987. The species is now known from Clear Creek, Jefferson, El Paso, Custer, Las Animas, Mineral, and La Plata Counties. It is most frequently encountered in the Pikes Peak area. ♣



Botanical Dragnet

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 said, "I just want the FAX."

"Well, lemme see," she said, "this guy came in with a pistil, and I know 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 mean 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 awhile, then we broke down the door. He had exhausted his ammunition, and the floor was littered with Brassicaceae. "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 in-florescence lights, and I feel quite superior ovary the whole thing.

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

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Calendar Overview

1991 Fall Workshops

- Oct 12 Botanical Illustration
Foothills N.C., Boulder
- Dec 7 Orchids of Colorado
Denver Botanic Gardens
- Jan 11 Genus *Draba* in Colorado
Univ. of Colo., Boulder

Special Events

- Nov 2 Annual Meeting
Museum of Natural History, Denver

Denver Chapter

- Oct 23 Favorite Slides
- Dec 11 North Table Mtn or Tundra
- Jan 22 Tropical rainforest research
- Feb 26 Aspens

Colorado Native Plant Society
P.O. Box 200
Fort Collins, Colorado 80522

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