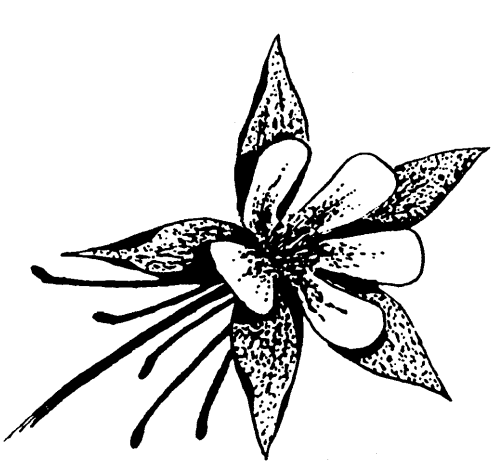
Aquilegia



Newsletter of the Colorado Native Plant Society

". . . dedicated to the appreciation and conservation of the Colorado native flora"

Volume 20 Number 4 October—December 1996

The Search for Rare Plants—Golden Columbine

Bill Jennings

Golden columbine (*Aquilegia chrysantha* Gray var. *rydbergii* Munz), is a taxon known from a few collections in southern Colorado. Little is known about the columbine, but it seems to show a pattern of disjunction similar to a number of other Arkansas Valley species, such as *Frankenia jamesii* (James frankenia), *Menodora scabra* (rough menodora), *Allionia incarnata* (trailing four-o'clock), and *Thamnosma texana* (Dutchman's breeches). These and other species are known (some only historically) from drier habitats in the Arkansas Valley, and then reappear in central or southern New Mexico. The columbine requires moisture or shade, and might be found in seepage areas on limestone cliffs within the Arkansas Valley or in tributary canyons. Creekside habitats are also suggested by available information.

On June 23, 1873, Edward L. Greene collected a yellow-flowered columbine from an unspecified location near Cañon City, Fremont County. T. S. Brandegee reportedly collected the taxon in the same area. In 1902, P. A. Rydberg described a new species of columbine, *Aquilegia thalictrifolia*, based on the Greene specimen. This name had already been used by Schott and Kotschy in 1853, so in 1946 Philip A. Munz provided a new name for the taxon, changing the status to a variety of the wide-ranging *Aquilegia chrysantha*. Rydberg had proposed *Aquilegia thalictrifolia* based largely on the smaller flowers of the Colorado plants. Munz disagreed, stating that this criterion was insufficient for maintaining a species.

Herbarium searches at University of Colorado (COLO), Colorado College (COCO), Kathryn Kalmbach Herbarium (KHD), and Rocky Mountain Herbarium (RM) revealed that all Colorado specimens of *Aquilegia chrysantha* var. *rydbergii* at these herbaria were taken in El Paso County, and most are very old. I did not encounter any specimens collected from the type locality near Cañon City. However, COCO holds specimens collected in the 1970s from North Cheyenne Canyon, just west of Colorado Springs. I observed the plant in two locations in North Cheyenne Canyon in 1994.

The Colorado Natural Heritage Program list of *Rare and Imperiled Animals, Plants, and Natural Communities* (1996) includes *Aquilegia chrysantha* var. *rydbergii*, and ranks it as "G4 T3 SH." G4 means that the species is "apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery"; T3 means that the variety is "very rare or local throughout its range or found locally in a restricted range"; SH means that the taxon is "historically known from the state, but not verified for an extended period, usually greater than 15 years." While the typical form of the species is widespread in extreme western Texas, New Mexico, Arizona, and northern Mexico, and is not threatened or endangered, the variety *rydbergii* is limited to Colorado, according to the treatment of Munz. It appears that there are only four localities where the variety has ever been collected: North Cheyenne Canyon, South

—Continued on page 10

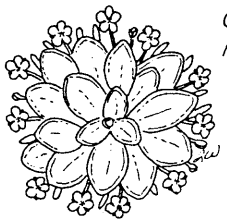
Contents

1997 DUES REMINDER

You have recently received your dues notice as a separate mailing. Please check your mailing label, which will say PAID THRU 96 (or some other year). Dues cover a calendar year, so if you are not paid through 1997 please complete the membership questionnaire and return with your 1997 dues. Note that this year for the first time there is an option to receive your newsletters by First Class mail for an additional $2.00. Please be sure to mark the First Class box clearly if you want this option—otherwise we don't know whether you intended to make a donation or to pay for First Class mailing. The membership questionnaire is also your opportunity to help determine the Society's activities and directions. Use it to suggest a field trip location, volunteer for a Society committee or to help with a chapter or field trip, or tell us what you think the Society should be doing or could do better. Please help us by returning the questionnaire even if you do not owe dues. Dues and questionnaires go to:

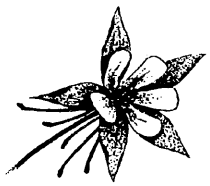
Colorado Native Plant Society, P.O. Box 200, Fort Collins CO 80522.

Aquilegia is printed on recycled paper



Claytonia megarhiza
Artist: Janet Wingate

Colorado Native Plant Society



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 Colorado's native plants. The Society sponsors field trips, workshops and other activities through local chapters and statewide. Contact the Society, a chapter representative, or committee chair for more information.

Schedule of Membership Fees

Life	$250
Supporting	$ 50
Organization	$ 30
Family or Dual	$ 15
Individual	$ 12
Student or Senior	$ 8

Membership Renewal/Information

Please direct all membership applications, renewals and address changes to the Membership Chairperson, Colorado Native Plant Society, P.O. Box 200, Fort Collins, CO 80522. Please direct all other inquiries regarding the Society to the Secretary at the same address.

Aquilegia

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

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

Newsletter Contributions

Please direct all contributions to the newsletter to:

Tamara Naumann
24 Park Lane
Dinosaur, CO 81610
E-mail:
Tamara_Naumann@nps.gov

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 submitted on disks (IBM-compatible, please) are appreciated. Please indicate word processing software and version.

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and	Sue Martin	226-3371
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ANNOUNCEMENTS

Coffee, Tea and DBG

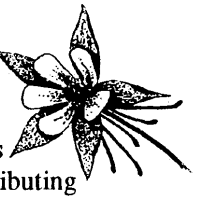
Denver Botanic Garden Offers Educational Series on Economically Important Plants

The Denver Botanic Gardens (DBG) will be hosting a monthly series of educational events highlighting economically important plants. This exciting program begins in January 1997, just as DBG closes its conservatory for one year for renovations. Learn about the important role plants play in our daily lives through this informative series, which is designed to enhance community involvement by promoting local businesses.

The first event in the series will focus on coffee and tea and will be held January 18, 19 and 20 from 9 a.m. to 5 p.m. Visitors will be able to sample and purchase a wide variety of teas and coffees as they learn about these important plants. Exhibits featuring habitat, distribution, and ethnobotanical information will be placed along with booths. Scheduled talks by invited speakers will cover a number of topics related to these two beverages. Speakers include Trish Flaster, ethnobotanist and editor of the Economic Botany newsletter, Dr. Jane Bock, CU biology professor, and Kevin Knox, author of "Coffee Basics." Children's activities are also planned.

These events are free for members of the Garden; non-members must pay only the gate admission fee. For a complete list of speakers and information on other events in this series, contact Mignon Macias at (303) 786-9297.

CONPS IS LOOKING FOR A VOLUNTEER TREASURER



If you have bookkeeping or accounting skills and would like to help out, think about contributing some of your time to CoNPS. It's especially convenient for a Fort Collins member.

The work of the Society can't happen without the active involvement of members like you. Carol Riley has done a terrific job for the past couple of years. She's expecting a new family member this spring and scrambling to finish her Master's degree (see her article on her work in the San Luis Valley in *Aquilegia* Vol. 20 No. 2). Though her new duties will take her in new directions, we want to express our sincere appreciation for her efficient and helpful contributions to the work of the Society.

Duties of the Treasurer:

- maintain checkbook
- make deposits to the Society's accounts
- retrieve and distribute the mail that comes to the Sociey's Fort Collins post office box
- prepare annual financial statements
- provide financial advice to the Board of Directors

If you think you might be interested in lending a hand, call Carol Riley (970-493-1367) for information on the office or call President Tom Ranker (303-492-5074) to volunteer.

Colorado's native flora needs you!

Stalking the Wild Potato

The U.S. Potato gene bank at Sturgeon Bay, Wisconsin, is interested in locating populations of the wild potato species, *Solanum jamesii*. Plants are typically less than 20 cm tall, with pure white pentagonal flowers (if present). Typical habitat is juniper scrub or river bottoms in moist, highly organic soil, at 6000 to 7000 feet. White tubers about 1 cm in diameter may be found on long rhizomes, up to 1/2 meter from the stem. This species often occurs as rare, very localized colonies of only a few plants. Peak season should be July through September.

To receive more information about *S. jamesii* and the proposed research project, or to report sites where this species has been observed, please contact:

John Bamberg
USDA/ARS, Potato Introduction Station
4312 Hwy 42
Sturgeon Bay, WI 54235

phone: (414) 743-5406
fax: (414) 743-1080
E-mail: nr6jb@ars-grin.gov

Thanks and Welcome!

Big thanks to outgoing Secretary, Mark Gershman, and a big welcome to Bev Johnson, our new Secretary. Mark's incredible organizational skills brought us the most complete and timely Board minutes we've ever experienced. Mark tackled all sorts of jobs—large and small—on behalf of the Native Plant Society. Please give him a pat on the back next time you see him!

Bev lives and works in Boulder and will be able to bug Mark very conveniently as she learns the ropes.

A warm welcome is in order for our newest elected Board member, Leo Bruederle, who lives and works in Denver.

THANKS for your time and enthusiasm!

Colorado Flora Miscellany—*Heterotheca* Revisited

William A. Weber
Curator Emeritus
University of Colorado Herbarium

Heterotheca earns its family reputation for being "those DLYC" (damned little yellow composites). I recently reevaluated our collections so that the specimens could be entered in the database for Colorado. In Colorado, the genus has a great diversity of forms that, for the time being, is best lumped into *Heterotheca villosa* in a broad sense (*sensu lato*). However, there probably are few genera of Colorado Asteraceae that have been given more species names, beginning with Asa Gray and Nuttall, and culminating with Greene and Rydberg. Variable characteristics such as leaf size and shape, bracts near the bases of the heads, types of pubescence and their arrangements on the stems and leaves, number of heads per stem, presence or absence of glands, and branching patterns, are all are found in *H. villosa*, in bewildering combinations. Yet there are local populations that are surprisingly distinctive and fairly stable.

What to do? We could try to match up all of the variable specimens to names given them by Greene and Rydberg and declare each variant a species, or we could throw up our hands and boil them all down into *H. villosa*. Cronquist, in *Intermountain Flora*, essentially did the latter.

There is not space enough here to go into the question of whether *Heterotheca* or *Chrysopsis* is the right name for our genus, except to say it is agreed that *Heterotheca* is the older name. The generic problem lies mostly in the eastern U.S. We are concerned with taxonomic questions below the genus level.

However, until we know something about the biology and history of these pesky plants, we should be careful not to lose the many individual trees in a single amorphous forest. It appears that Cronquist struggled for years without coming to any conclusion, but then had to get his book published (unfortunately he died before it came out). We find that for the entire Intermountain region, he recognized only *H. villosa* and *H. jonesii* (which he regarded as a fairly well-marked dwarf variety). No one else before or since Cronquist has arrived at a satisfactory arrangement.

In Colorado, I find that we have several fairly clean "species," or at least races, of the *H. villosa* group. At the risk of oversimplification, one of these is what I call *H. foliosa*. This is a plant with dense, appressed pubescence, giving the plant a silky aspect; the leaves hardly become smaller upward and form a group of leaflike bracts below the heads. This type is very common at the base of the foothills but also occurs in the dry subalpine. The second "species" is *H. pumila*, a subalpine and alpine plant that forms a very showy hemispherical mound, each stem usually with only one head with very showy rays. The rest of the mess falls under the name *H. villosa*, an extraordinarily varied group of microraces: some are almost glabrous with ciliate leaves, some are sticky-glandular, some are stiffly hirsute or scabrous. All of these sometimes show combinations of characters, suggesting hybridization.

We do not know what the history of this group is. I can see discrete microraces in New Mexico, Arizona, Utah, and Nevada, some of which probably deserve names in some category. We have no idea why some of these are distinct while the greater mass is a morphological bouillabaisse. I think that possibly before humans came on the scene, *Heterotheca* had settled out some subspecies fairly well; then the populations lost their discreteness by changes in climate following the last glaciation, tending to "hybridize the habitats," as Edgar Anderson would say. Then came the white man with his development of roads and disturbed places, moving some of these races around until their geographic ranges were no longer clear. *Heterotheca* is especally happy in disturbed places and roadsides.

Action for CoNPS

We recognize the fact that there is a taxonomic mess here, but what do we really know about it? I think that one thing needs to be done, and that is for us to observe these forms more intelligently in the field: Are these races recognizable on the small geographical scale? Do we find more than one race growing together? Do they appear to be varying in a hybrid pattern, or do they remain perfectly

—continued on page 5

Continued from page 4—

discrete even when growing together? Let's get chromosome counts of the races. Polyploids are known to occur, but the evidence from Colorado material is virtually nonexistent. There may be less chaos than we see from the herbarium specimens. Certainly the genus is so abundant that a large number of observers can find ample work to do! Also, we should try to relocate the type localities of the myriad of "small species" described by Greene and Rydberg and see whether they were really seeing anything; chances are they were. I think that we might well use the nomenclaturally invalid term "microraces" for the distinctive forms until they are better understood. There is so much to learn about the Colorado flora—the stones have been laid, but the foundation needs to be cemented together!

Post Script

After writing this, I went to Doudy Draw on Boulder Open Space to try to locate a goldenrod—no sign of the goldenrod, but *Heterotheca* was abundant. On the level surface of the colluvial fan that forms a bench above the creek, a *Heterotheca* occurred with stems less than a foot high, scattered singly or a few together, with green, hirsute, somewhat twisted leaves, and distinctly pedunculate heads. There were no seeds, the empty receptacles open to the wind; it had flowered probably a month ago. I call this *H. villosa.*

On a dry knoll above the level surface of the fan, there was another *Heterotheca.* This one was definitely caespitose, with several stems from a single taproot. The leaves were densely silvery-silky with appressed hairs; the heads were sessile—several together in a cluster of bracts. The stems were twice the size of the first type. Seeds were present, and a few heads were still flowering. I call this *H. foliosa.*

Then we had a surprise. On the level bench we discovered a single plant that combined characteristics of the two. This is a caespitose plant with a dozen stout stems. It is twice as large as either of the others, has very broadly ovate, sessile, green, scabrous leaves, spreading hairs on the stem, and a terminal cluster of sessile heads. There seem to be no others in the area we walked over. We suspect this to be a hybrid, *H. villosa* X *H. foliosa.*

We collected seed from the two forms that had them, and hope to get chromosome counts of these; I will return next year for the seeds of the third. If we have a hybrid, it would indicate that these species are separated by fairly effective barriers to crossing, possibly one being the flowering season. Perhaps other observers will have similar experiences. The questions to ask are these: How many types are found in a single small area? Do they differ ecologically? Do they have different flowering times? How do they differ morphologically? Are intermediates rare, common, or nonexistent? *Heterotheca* may make some sense after all, but we need to sharpen our eyes and wits to find out what goes on in nature.

Horticultural Notes—*Eustoma grandiflorum* (prairie gentian)

Editor's Note: This is the first in a series of abstracts submitted by ***Jim Borland*** *on Colorado native plants that appear in the horticultural trade. Jim follows horticultural research literature and has graciously volunteered these interesting synopses.*

Fading *Eustoma* Flower Color

Notable fading of petal color has been a problem with cut *Eustoma* flowers in the home, detracting from their appearance and reducing their acceptance. Investigations revealed that flower fading is associated with an increase in floral pH as open flowers age. A 7% increase in pH resulted in a 10% reduction in color intensity. Flowers that opened under low light conditions were paler than those opening under high light intensity—a 25% reduction in light intensity was associated with a 30% reduction in anthocyanin (pigment) concentrations and a 40% reduction in color intensity.

Griesbach, R. J. 1992. Correlation of pH and light intensity of flower color in potted *Eustoma grandiflorum* Grise. *HortScience* 27(7): 817-818.

Eustoma Growth At High Temperatures

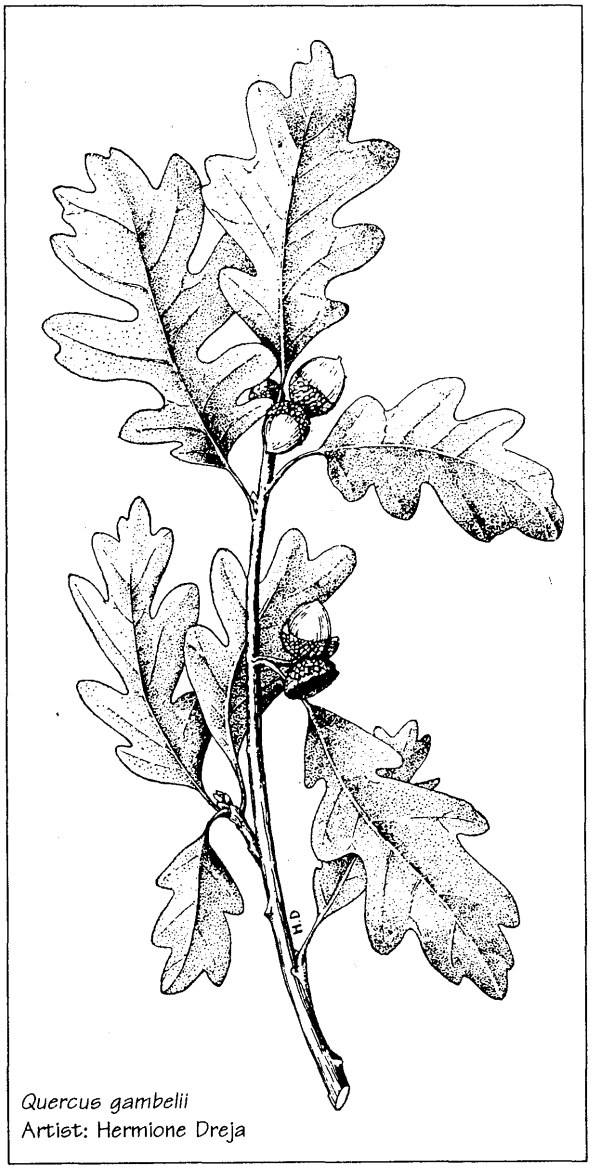
Decreased bloom in *Eustoma grandiflorum* cultivars grown in the greenhouse during summer is a vexing problem that prompted researchers to evaluate plant rosetting characteristics. Experimental variables included seedling age, cultivar type and time of exposure to high soil temperature. Results generally indicate that increasing the time spent at high soil temperatures (greater than 72º F) decreases the number of seedlings that bloom.

Harbaugh, B. K., *et al.* 1992. Rosetting of *Lisianthus* cultivars exposed to high temperatures. *HortScience* 27(8): 885-887.

Author's Note: The first commercial breeding and production of Eustoma *in the nation took place in Palisade, Colorado, in the early 1980s.*

WINTER & SPRING WORKSHOPS — 1997

The Colorado Native Plant Society workshop series was established in 1985 to provide members with wintertime activities when field trips are impractical. Workshops bring native plant lovers together with a well-informed instructor who may have herbarium specimens, live plants, photographs, identification keys, and other materials available for hands-on study. The opportunity to receive one-on-one instruction and informative lectures has made the workshop series one of the most popular Native Plant Society programs. Attendees need no special skills or background; a love of plants and a desire to learn are the only prerequisites. There are no exams, grades, or homework, and working together is encouraged. The goal is to demystify plant identification and to enhance our enjoyment and understanding of Colorado's native flora.



Quercus gambelii
Artist: Hermione Dreja

To register for workshops, please call (303) 665-6903 and leave a message on the answering machine. You may also register by mail: write Bill Jennings, P.O. Box 952, Louisville, CO 80027. Whichever way you register, be sure to provide your name, address, telephone number (including area code!), and which workshops you wish to attend. If multiple sessions are scheduled, be sure to indicate your preference. Receipt of your registration request will be acknowledged within a few days.

About ten days prior to the workshop, registrants will receive notice by mail (or by electronic mail if you provide an E-mail address) regarding location, time, lunch, references, and supplies, with a list of other registrants to encourage carpooling. The fee for each workshop is $10 for CoNPS members and $22 for non-members ($10 for the workshop—$12 to join the society). Payment is made on the day of the workshop.

Workshops have been very popular in the past, with multiple sessions frequently scheduled to meet demand, or with long waiting lists for the seats available. However, no-shows have been a problem. There are only so many seats available in the classrooms and labs where these workshops are held, and we are holding a seat for you. If you find that you CANNOT attend a workshop for which you are registered, please call and cancel your registration as soon as possible!

Long-time members of CoNPS may recall that Bill has done much the work of organizing, taking registrations, sending notices, taking payments, providing refreshments, as well as teaching occasional workshops. We encourage CoNPS members to join the workshop committee and help ensure the continuation of the program. Any help is always appreciated.

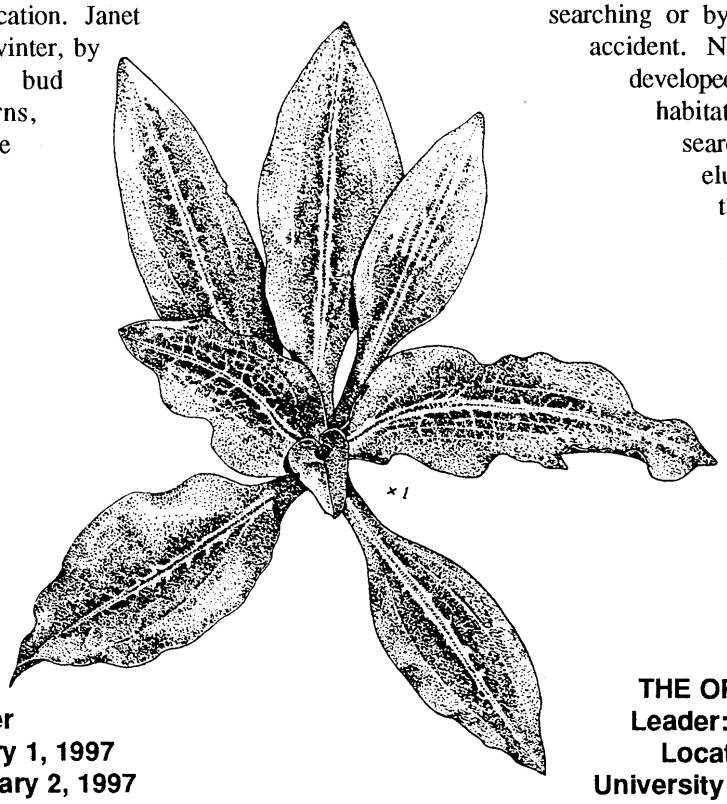
Volunteers are needed to lead workshops, particularly for plant families with few representatives in Colorado. If you have a favorite plant family or genus, or there is a family or genus about which you wish to know more, then consider leading a workshop on the topic. Refer to the books of Dr. William A. Weber (*Colorado Flora: Eastern Slope*; *Colorado Flora: Western Slope*; or *Rocky Mountain Flora*) to determine the number of species in a given family or genus. Full-day workshops dedicated to a single family or genus usually cover 15 to 30 species; a half-day workshop is practical for seven to 15 species. Call Bill Jennings and he will tell you what is involved in preparing a workshop. If you volunteer NOW, you will have all winter to work in the herbarium, all next summer to look at plants in the field, and the fall of 1997 to organize your program before presentation in the winter of 1997-1998. Remember, on the day of the workshop, no one will know more about the topic than you!

It takes considerable time and effort for the instructors to plan and develop workshops or field trips. Please let us know how you like the activities offered by CoNPS. We need your suggestions for future workshops and field trips. We appreciate feedback on whether you find them informative and exciting or dull and uninteresting.

WINTER & SPRING WORKSHOPS — 1997

WINTER TWIG IDENTIFICATION
Leader: Janet J. Coles
Location: Foothills Nature Center, Boulder
First session: Saturday, January 11, 1997
Second session: Sunday, January 12, 1997

We schedule workshops during the winter because you can't do field botany then, right? Actually, there's still a lot to see and do in the field from November to March in Colorado, provided you know what to look for. Woody plants, in particular, are the most obvious element of the winter landscape, but except for the conifers, are not in leaf or in bloom. This presents interesting challenges to plant identification. Janet will show how to identify plants in winter, by using bark color and texture, bud characteristics, branching patterns, persistent fruit, and habitat. Some plants that are not woody, but persistent and identifiable in death, will also be covered. If weather permits, we will go to the field after lunch and put our newly learned skills to good use. .



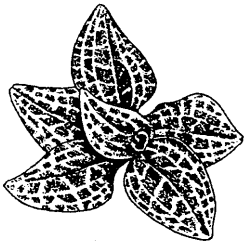
Goodyera repens
Artist: Carolyn Crawford

THE CHIHUAHUAN ELEMENT IN THE COLORADO FLORA
Leader: Dina Clark
Location: Ramaley Building
University of Colorado at Boulder
First session: Saturday, February 1, 1997
Second session: Sunday, February 2, 1997

Dina Clark recently completed her master's degree at CU—Boulder, with thesis research on the Mesa de Maya, Las Animas and Baca Counties, in southeastern Colorado. This part of Colorado is most unusual, as there are many plants present that are part of the mountain and desert floras of northern Mexico, reaching their northern limits here. There is a significant number of Rocky Mountain and Great Plains species present, to be sure, but the Chihuahuan elements are the focus of this workshop. Learn why this part of Colorado has this element as a significant portion of its flora and learn how to identify these plants that occur nowhere else in Colorado. East of Interstate 25, Colorado is not just a flat, featureless grassland! Southeastern Colorado has a very interesting and unique flora. This area really grows on you once you get to know it.

MOONWORTS
Leader: Peter Root
Location: Kathryn Kalmbach Herbarium
Denver Botanic Gardens
First session: Saturday, February 22, 1997
Second session: Sunday, February 23, 1997

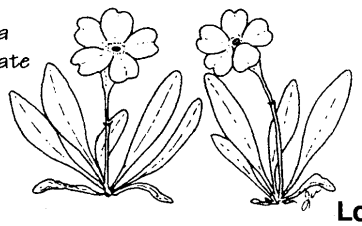
The ferns in the Ophioglossaceae are small and many are rare. Most are on the list of Colorado Plant Species of Special Concern. As a result, moonworts (*Botrychium*) are seldom encountered by the botanical public. They are exceedingly difficult to see in the field, and one encounters them after much diligent searching or by stumbling upon them by accident. Nevertheless, Peter Root has developed an eye for *Botrychium* habitat, and has spent many years searching and viewing these elusive plants. He will present the species that are currently known for Colorado, and bring us up to date on *Botrychium* research.



THE ORCHIDS OF COLORADO
Leader: Dr. Charles J. Sheviak
Location: Ramaley Building
University of Colorado at Boulder
First session: Saturday, March 15, 1997
Second session: Sunday, March 16, 1997

We are very pleased that orchid expert Chuck Sheviak has agreed to present a workshop on a topic that is constantly in demand. Everyone loves the orchids. The orchid family has some of our most beautiful wildflowers, and also has some of our least showy plants as well. Dr. Sheviak has done extensive work in several problematic groups, including *Spiranthes* (the ladies'-tresses), *Cypripedium* (the lady's-slippers), and *Platanthera* (the bog orchids). He is currently preparing the treatment for the bog orchids for *Flora North America*, and has some interesting observations that he wishes to share. Although all the Colorado species will be discussed, the focus of the workshop will be on the recent developments in the bog orchids.

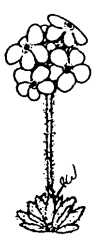
WINTER & SPRING WORKSHOPS — 1997



Primula angustifolia
Artist: Janet Wingate

THE PRIMULACEAE OF COLORADO AND NEIGHBORING STATES
Leader: Dr. Sylvia "Tass" Kelso
Location: The Colorado College, Colorado Springs
First session: Saturday, April 12, 1997
Second session: Sunday April 13, 1997

Tass Kelso has worked in the primrose family for a number of years and has published extensively, particularly on genus *Douglasia*. This genus occurs to the north of us, and is particularly well-• developed in Alaska, where Tass did her thesis research. In Colorado, we have representatives in seven primulaceous genera: *Anagallis, Androsace, Dodecatheon, Glaux, Lysimachia, Naumburgia*, and *Primula*. The same or similar species are present in neighboring states, so the principles learned here will be applicable over a wide area. *Primula*, in particular, is problematic in the West, with many endemic species described. The relationship between these species is not clear, and Tass will bring us up to date on the status of the research.



Androsace chamaejasme
Artist: Janet Wingate

THE ULTIMATE *ASCLEPIAS* WORKSHOP
Co-leaders: Carolyn Crawford, Dr. James Locklear, and David Anderson
Location: Piñon Canyon Army Maneuver Area
Classroom session: Saturday, May 10, 1997
Field session: Sunday May 11, 1997

There are 19 species in the milkweed family in Colorado, 18 in *Asclepias* and one in *Sarcostemma*. Several are rare, peripheral, or simply overlooked in Colorado. All species will be discussed, but the focus is on the Asclepiodella complex, which includes *Asclepias uncialis*, and several other species of small milkweeds that occur in New Mexico, Arizona, Utah, and Nevada. Quite a bit of work has focused on this group in the last several years, with Jim Locklear searching the plains in many sites and David Anderson scouring the Piñon Canyon area. Pressed specimens, alcohol-preserved specimens, and lots of slides will provide plenty of material for participants to study during the classroom session. The following day, we will see *Asclepias uncialis* in the field at Piñon Canyon. LIMITED TO 20 REGISTRANTS!

FIELD TRIP REPORT

Rocky Flats: The Silver Lining to the Mushroom Cloud

Report by Ruth Carol Cushman

On September 14, Ken Brakken, Department of Energy (DOE) ecologist, led a CoNPS field trip into the Rocky Flats Environmental Technology Site and the adjacent buffer zones. The day started with an osprey soaring overhead. Later we saw many mule deer, a coyote, and a deer mouse. Ken said great horned owls and barn owls hang out around the derelict barns of the historic Lindsey Ranch, hidden in one of the valleys of Rock Creek. Foxes and other small mammals are common. In spring, loggerhead shrikes, black-crowned night herons, and grasshopper sparrows nest here. We ate our picnic lunches near Antelope Springs, at the site of a century-old stagecoach stop, and above an equally old apple orchard still bearing fruit.

It was a day of paradox. Amazingly, plant life and wildlife flourish next to a place where plutonium has been processed and where nuclear wastes are stored. In fact, without the presence of the facility that once made nuclear bomb triggers, the Rocky Flats properties might have become another Rock Creek subdivision. Instead, the area remains in nearly pristine condition. The outer buffer zone has not been grazed since 1972, and the inner buffer zone not since 1952. With 320 documented plant species, the Rocky Flats area is now considered one of the most biologically diverse areas along the Front Range, and, according to the Colorado Natural Heritage Program (CNHP), it has the largest remaining example of xeric tallgrass prairie in Colorado and perhaps in North America. These are also considered to be relictual populations once connected to the tallgrass prairies hundreds of miles to the east, during the moister climates of the early Holocene Epoch. As a result of their inventory, the CNHP recommended the site as a National Environmental Research Park.

One of the reasons tallgrass prairie thrive here is the well-drained clay and cobble loam, known as the Rocky Flats alluvium,

—continued on page 9

Continued from page 8—

into which the prairie root system can extend from five to eight feet. Laid down about two million years ago, this is also one of the oldest soil surfaces in the Southern Rocky Mountains. Underlying the alluvium is a healthy aquifer supporting the unique hillside seep shrublands (hawthorn, chokecherry, American plum, and western snowberry) and Great Plains riparian communities (plains cottonwood, peach-leaf willow, and coyote willow) found among the rolling hills.

Ponderosa pines reach the lower edge of their range here. The area also contains three rare plants: fork-tip three awn (*Aristida basiramea*), narrow-leaf milkweed (*Asclepias stenophylla*), and a sedge (*Carex oreocharis*); plus two rare butterflies: Argos skipper (*Atryone arogos*) and hops blue (*Celastrina* sp.); and the Preble's meadow jumping mouse (*Zapus hudsonius* ssp. *preblei*). We didn't see the famous jumping mouse—which is under consideration for threatened or endangered status—but Ken showed us the coyote willow and cottonwood riparian areas it inhabits.

In addition to their ecological significance, these wide-open spaces are very beautiful. Even though it was late in the season of a very dry year, we saw many native plants still in bloom: groundsel, gumweed and prickly poppy along the roads; gayfeather and Porter's aster on the prairie; and monkeyflower, mints, prairie cordgrass, and willowherb at Antelope Springs. The big bluestem and other prairie grasses were so tall in some places that we could only see the ears of several mule deer. Not surprisingly, many people have suggested that Rocky Flats merits protection as Open Space.

The Rocky Flats facility was the site of a lightning-caused prairie fire before our visit. We walked through the burned area and observed the new sprouts of prairie plants and some weeds pushing up from the blackened soil. The historic suppression of fire has allowed a detrimental buildup of plant litter in some areas. The burned area provides an opportunity to study the effect of fire on the prairies at Rocky Flats.

Unfortunately, we also saw a profusion of knapweed. It appears to be spreading from gravel mines west of the buffer zone. The Department of Energy has sprayed the knapweed with Transline, an herbicide with a narrow focus but only one year of effectiveness. Ken said that other herbicides, such as Tordon, may be necessary to control this pernicious weed.

Today, the greatest threat to these prairies is the encroachment of gravel mining. Jefferson County has conditionally approved mining on two of the tallgrass prairie relicts—pending the outcome of a multiyear study of the status and quality of tallgrass prairie relicts throughout the county. This study is being conducted by David Buckner, Rick Brune, Sally White, Paul Kilburn, and others. The prairie seems rugged enough to withstand some surface abuse, but once the alluvial soils are removed—and the prairie root system destroyed—the prairie will not regenerate. Mining may also interrupt the underlying aquifer and dry up the hillside seep communities.

After concluding our tour with Ken, we visited the proposed future site of one of these mines, on an adjacent state school section located along the east side of Highway 93, south of the entrance to Rocky Flats. Rick and Sally believe this is the best remaining area of xeric tallgrass prairie in Jefferson County and one of the best in Colorado. One result of the efforts of Rick, Sally, and others to prevent this prairie from becoming a huge gravel pit is the County Commissioners' decision to issue mining permits conditional on the outcome of their study.

Ken expressed a willingness to conduct more field trips to help educate others about the unique resources at Rocky Flats, and he stressed that the DOE welcomes comments. "You can affect the future of this site," he said. Comments about the ultimate use of the lands surrounding the Rocky Flats facility can be addressed to:

U.S. Department of Energy
Rocky Flats Field Office phone:
Attn: Ken Brakken (303) 966-3071
Building 116
P.O. Box 928
Golden, CO 80402-0928

CHAPTER NEWS

Metro-Denver Chapter

Monthly meetings are held at the Denver Botanic Gardens (DBG) at 7:30 p.m. Room assignments vary, so please check the location for each meeting. Regularly scheduled meetings are held on the fourth Tuesday of each month from September to May, except for the November/December combined meeting.

January 28—Gentians of Colorado and Adjoining States
Morrison Center.
Carolyn Crawford and Bill Weber gave a workshop on gentians three years ago. Carolyn has continued her work with this family along with her husband, Bill Jennings. She will present a photographic slide show of the gentian family and will discuss new information developed since the workshop.

February 25—Mushrooms of Colorado
Morrison Center.
Join Vera Evenson, Associate Curator of Mycology at DBG, for a look at Colorado mushrooms. Her upcoming publication on this topic is due out this spring and will be published jointly by DBG and the Denver Museum of Natural History.

Plateau Chapter

January 25—Western Slope Forest Insects and Disease
USDA Forest Service Office, Delta.
Tom Eager, USDA Regional Entomologist, will talk about insects, disease, fire, and their relationship to each other and to forest health. Tom will cover the different species of insects found in our region. Cost is $10 to go to CoNPS for materials and mailing. To register, call Bob Clark (970) 242-6067.

February 22-23—Introductory Botanical Illustration
Paula Nicholas, an instructor at the Denver Botanic Garden, has agreed to travel to the Western Slope to teach this workshop. Call Carol Jacobs-Carre (856-7556) or Gretchen Van Reyper (835-3268) if you are interested. We need at least ten students. The cost will be $30 - $40 for two full days.

Continued from page 1—

Cheyenne Canyon, and Bear Creek Canyon, all near Colorado Springs in El Paso County, and at an unspecified location near Cañon City (the type locality). Thus, the rank for the variety should be T1 (the variety is "critically imperiled globally because of extreme rarity . . . or because of some factor of its biology making it especially vulnerable to extinction"). In addition, my relatively recent observations in North Cheyenne Canyon suggest that the SH rank should be changed to S1 (the taxon is "critically imperiled in [Colorado] because of extreme rarity . . . or because of some factor of its biology making it especially vulnerable to extirpation from the state."

The typical variety of golden columbine was described from specimens collected by Charles Wright in the Organ Mountains of extreme southern New Mexico. Specimens of the typical variety have been seen from as far north as Mount Taylor in Cibola County, New Mexico. Martin and Hutchins, in *A Flora of New Mexico*, report collections from as far north as Sandoval County, about on the same latitude as Santa Fe. Apparently, the species is unknown in northern New Mexico. In Arizona, specimens have been collected from the Flagstaff area. Specimens also document the plant's occurrence in Zion Canyon, Washington County, Utah.

The State of New Mexico Forestry and Resources Conservation Division (Energy, Minerals, and Natural Resources Department) does not list *Aquilegia chrysantha* as a plant of special concern. However, variety *chaplinei*, a long-spurred form of golden columbine, sometimes treated as a distinct species, is listed as sensitive. *A Handbook of Rare and Endemic Plants of New Mexico* (1984) lists that taxon as state threatened. In both publications, the plant is characterized as occupying seepy limestone outcrops in the Guadalupe Mountains, in Eddy County, New Mexico, and adjacent Texas. The occurrence of var. *chaplinei* on limestone suggests the intriguing possibility of finding var. *rydbergii* in similar habitat in the Cañon City area.

The Arkansas Valley flora shows interesting patterns of endemism and disjunction, as *Aquilegia chrysantha* var. *rydbergii* illustrates. Additional research will illuminate the range and habitat of variety *rydbergii*, as well as the typical variety, and settle the taxonomic question of whether the Colorado plants are significantly different from the New Mexico plants.

FOR YOUR LIBRARY →

CONPS is pleased to provide a selection of books to members at discount prices. If you are interested in any of the publications listed on the following page, contact:

Velma Richards
3125 Monmouth Ave.
Englewood, CO 80110
(303) 794-5432

Sibbaldia procumbens
Artist: Janet Wingate

Make check payable to CONPS. Postage costs are additional for books received by mail. If you want to save postage charges, you can pick up the books yourself (from Velma Richards in Denver, Lynn Riedel in Boulder, or Myrna Steinkamp in Fort Collins).

Aquilegia chrysantha
Artist: Janet Wingate

COLORADO NATIVE PLANT SOCIETY — DISCOUNTED PUBLICATIONS ORDER FORM

Title	Author	Price Each	Postage Each	Book Total	Postage Total
Alpine Wildflowers of Northern Rocky Mountains	D. Strickler	$ 7.50	$ 1.50		
Botany for Gardeners	B. Capon	$ 15.00	$ 2.00		
Catalogue of the Colorado Flora...	W. A. Weber and R. C. Wittmann	$ 36.00	$ 2.00		
Colorado Flora: Eastern Slope (1996 edition)	W. A. Weber	$ 24.00	$ 2.00		
Colorado Flora: Western Slope (1996 edition)	W. A. Weber	$ 24.00	$ 2.00		
Colorado Wildflowers	C. F. Jones	$ 5.50	$ 1.00		
Colorado's 30 Troublesome Weeds	Colorado Weed Management Association	$ 3.00	$ 1.00		
Edible Wild Plants of the Prairie	K. Kindscher	$ 10.50	$ 2.00		
Field Guide to Colorado Wildflowers - Volume 1	G. K. Guennel (plains and foothills volume)	$ 18.75	$ 2.00		
Field Guide to Colorado Wildflowers - Volume 2	G. K. Guennel (mountains volume)	$ 18.75	$ 2.00		
Flora of the San Juans	S. Komarek	$ 15.75	$ 2.00		
Floristic Survey: Black Forest	Anne Maley	$ 3.00	$ 1.50		
Floristic Survey: Mesa de Maya Region	Dina Clark	$ 4.00	$ 1.50		
Forest Wildflowers of Northern Rocky Mountains	D. Strickler	$ 7.50	$ 2.00		
Gardener's Guide to Plant Conservation	N. T. Marshall (published by WWF and GCA)	$ 7.00	$ 2.00		
How to Identify Plants	H. D. Harrington and L.W. Durrell	$ 8.00	$ 2.00		
Illustrated Keys to the Grasses of Colorado	J. Wingate	$ 7.50	$ 1.25		
Life In An Aspen Grove (VIDEO)	CoNPS	$ 20.00	$ 3.50		
Life In An Aspen Grove (SLIDE/TAPE)	CoNPS	$ 42.00	$ 3.50		
Medicinal Wild Plants of the Prairie	K. Kindscher	$ 10.50	$ 2.00		
Meet the Natives (ninth edition)	M. W. Pesman	$ 10.50	$ 2.00		
Plant Identification Terminology	J. G. Harris and M. W. Harris	$ 14.50	$ 2.00		
Plant List: Dinosaur National Monument	T. Naumann	$ 1.25	$ 1.00		
Plants of Florissant Fossil Beds Nat'l Monument	W. A. Weber and M. Edwards	$ 2.50	$ 1.00		
Prairie Wildflowers of Northern Rocky Mountains	D. Strickler	$ 7.50	$ 1.50		
Rare Plants of Colorado	CoNPS	$ 8.00	$ 1.00		
Rocky Mountain Berry Book	B. Krumm	$ 7.50	$ 1.50		
Rocky Mountain Flora	W. A. Weber	$ 16.00	$ 2.00		
Simplified Guide to Common Colorado Grasses	J. Wingate	$ 3.25	$ 1.00		
Southern Rockies, Sierra Club Guide	A. Benedict	$ 16.00	$ 2.00		
Tallgrass Prairie Wildflowers	D. Ladd	$ 15.00	$ 2.00		
A Utah Flora (1993 edition)	Welsh, Atwood, Higgins, and Goodrich	$ 68.00	$ 3.00		
Vascular Plants of Boulder County, Checklist of	W. A. Weber	$ 4.00	$ 1.50		
Vascular Plants of Montana	R. Dorn	$ 10.50	$ 2.00		
Vascular Plants of Wyoming (1992)	R. Dorn	$ 13.00	$ 2.00		
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CALENDAR OVERVIEW

CHAPTER MEETINGS

Metro-Denver Chapter

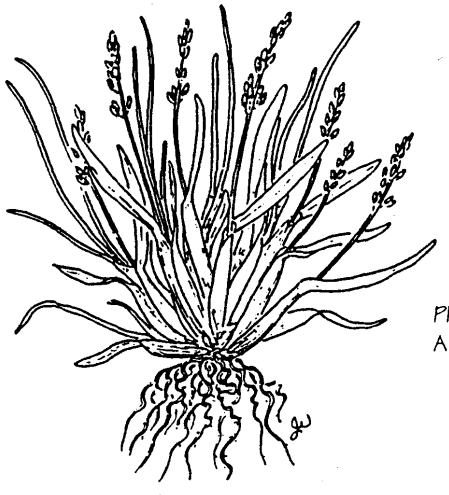
Jan 28 Gentians of Colorado and Adjoining States

Feb 25 Mushrooms of Colorado

Plateau Chapter

Jan 25 Western Slope Forest Insects and Disease

Feb 22–23 Introductory Botanical Illustration



Phippsia algida
Artist: Janet Wingate

1997 WORKSHOPS

Jan 11 & 12 Winter Botany
with Janet Coles

Feb 1 & 2 Chihuahuan Desert Flora in Colorado
with Dina Clark

Feb 22 & 23 Moonworts
with Peter Root

Mar 15 & 16 Orchids of Colorado
with Dr. Charles Sheviak

Apr 12 & 13 Primulaceae of Colorado and Neighboring States
with Dr. Tass Kelso

May 10–11 Milkweeds
with Carolyn Crawford

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