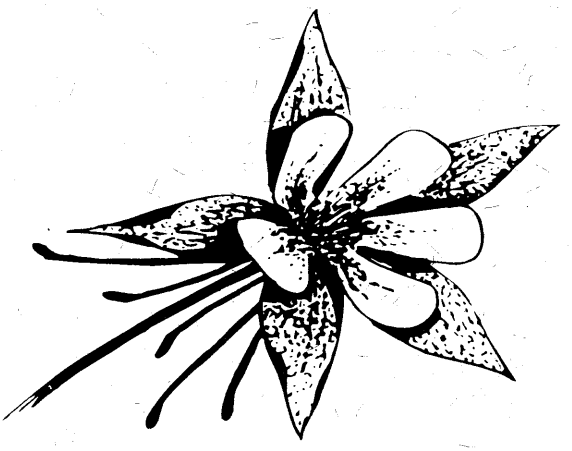
Aquilegia



Newsletter of the Colorado Native Plant Society

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

Volume 21 Numbers 2—4 April—December 1997

Baptism by ... Ice?

Systematic Investigations of Penland's Alpine Fen Mustard

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Migrating to Colorado from the Upper Midwest in 1994, this native flatlander was forced to quickly learn a new flora and re-evaluate the focus of his taxonomic research. I've always had an interest in arctic disjuncts - the Great Lakes Region harbors fascinating disjuncts including the Lapland Rosebay (Rhodendron lapponicum [L.] Wahlenb.) - so it is not surprising that the arctic affinities of the alpine flora piqued my interest. In 1995, I received funding from the Colorado Natural Areas Program to study *Eutrema penlandii* R. Rollins (Brassicaceae), the Penland alpine fen mustard. As a result, I quickly learned the idiosyncrasies of the uncompromising alpine environment.

The Penland alpine fen mustard is a diminutive plant that can be easily dwarfed by a regulation Swiss army knife. It is the sole representative of the genus *Eutrema* in Colorado, and one of two species of *Eutrema* occurring in North America. Found only in Colorado, *E. penlandii* is known from about one dozen sites in the Mosquito Range, where it is restricted in distribution to alpine tundra above 12,000 feet. As such, it is one of the most rare plant species in Colorado and is currently listed as threatened by the U.S. Fish and Wildlife Service. While little is known about the biology of this species, close proximity to deep snowfields resulting in continuously saturated soils and a cold microclimate have been proposed by Tamara Naumann, Graham Roy, and Tass Kelso as important micro-environmental characteristics supporting populations.

The purpose of the proposed research was to describe population genetic structure for *E. penlandii*, and assess genetic diversity within the context of the rarity and endemism of this species. A final objective of this research was to assess the relationship of *E. penlandii* to its circumpolar sister species *E. edwardsii* (Edward's mock wallflower).

What do you mean the snow may not melt? Renea Hardwick, a first year graduate student in the Department of Biology at The University of Colorado at Denver decided (with some arm-twisting) to tackle this research in order to satisfy the thesis requirement for her Masters degree. Now as many of you may remember, 1995 was a winter with large snow accumulations. That summer some passes never opened. Despite this, a great deal was accomplished. We obtained the Federal permits allowing us to collect two leaves from each of 25 plants for each of five *E. penlandii* populations. Yes, that's right. Two very small leaves! Unfortunately, we were only able to access a couple of sites that year, but developed the protocol for the genetic analyses that were to be used to address the aforementioned objectives. While concerned with our inability to access all of the populations, the preliminary data that Renea subsequently collected allowed us to re-evaluate and refine our objectives.

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Contents

THANKS!

Since the inception of Aquilegia in 1977, there have been many Society members involved in the production of this newsletter, some quite illustrious. The many contributions of our predecessors on the Communications Committee are reflected in the format of the newsletter, which has changed no fewer than eight times. Thus, if you note some deviations from your last newsletter, please be patient with us as we yet again redefine the process of newsletter production.

In addition to thanking all past Editorial Committee members and editors, we would like to thank Tamara Naumann, especially. Tamara has served as Chair or Co-chair of the Editorial Committee since 1992, and has been responsible for six volumes and more than 20 issues of Aquilegia. We sincerely appreciate Tamara's significant contribution. Thanks Tamara!

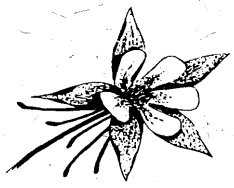
1998 DUES REMINDER

Please check your mailing label. If it does not say "Paid Thru 1998" (or later), your dues are now due. Remember, CoNPS dues cover a calendar year. If you are not paid through 1998, please send your renewal now to: Colorado Native Plant Society, P.O. Box 200, Fort Collins, CO 80522.

NEXT *AQUILEGIA* DEADLINE APPROACHES

Please submit all contributions for Volume 22 No. 1-2 of *Aquilegia* to Leo P. Bruederle before March 15, 1998. Note: The summer field trips and the book lists will be published in the next issue.

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 application, 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 for 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:

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Denver, CO 80217-3364
E-Mail: lbrueder@carbon.cudenver.edu

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 (MAC preferably, or IBM) are appreciated. Please indicate word processing software and version.

ANNOUNCEMENTS

WANTED

HERBARIUM TEAM MEMBERS

Boulder County Parks and Open Space is looking for volunteers interested in expanding their plant identification skills and knowledge. The Herbarium Team is a group of volunteers who identify, collect, and mount plant specimens from County Open Space. We will be holding an organizational meeting on March 18, 1997 at 7 PM at the Walden Ponds field office in Boulder. Please call Claire DeLeo (Boulder County Parks and Open Space Plant Ecologist) at 303-441-1643 for directions and more details.

VOLUNTEERS FOR NATIVE PLANT RESTORATION

Boulder County Parks and Open Space is looking for a few good volunteers to get involved in our Native Plant Restoration Program. Last year, volunteers collected native seed for wetlands and revegetation after weed control projects. Our emphasis on volunteer projects this spring will again be wetlands. This is a labor of love, and requires digging, lifting, and working in difficult terrain. We will include some training this year, and start off the season with a wetland planting on Earth Day, April 22, 1998. If you are interested in working hard to restore our native plants, please call Claire DeLeo (Boulder County Parks and Open Space Plant Ecologist) at 303-441-1643 for more details.

INTERESTED MEMBERS

The Seedheads, a subcommittee of the Genesee Forestry Committee, grew from the efforts of a small group of residents who had a great love for Genesee's special environment and wanted to see it protected. Among the first homebuilders in Genesee, they recognized the danger that roads and construction pose for our native plants and wildlife. As they became familiar with the many different species, they wrote articles for the *Genescene*, collected seeds, published a book, and inaugurated their first plant sale with plants grown from Genesee seeds. The Seedheads welcome anyone interested in learning more about preserving Genesee's rare and special plant environment. Individual members may choose to participate in a variety of ways. Almost everyone helps with seed collection and the plant sale. Others photograph, collect data, and keep records of native plants; write articles for *Genescene*; and help plan other educational activities. Call Anne Oliphant (526-7411) if you would like to join.

Western Slope Site for 1998 Annual Meeting of Society

Reserve the weekend of September 18-20, 1998 for the Annual Meeting of the Colorado Native Plant Society. Sagebrush Ecology will be the topic of this year's meeting, which will be held at the Aspinall-Wilson Conference Center on the campus of Western State College in Gunnison. Sagebrush (*Artemisia* spp.) communities are widespread throughout the western slope of Colorado, and provide critical habitat for many species, such as the Gunnison milkvetch (*Astragalus anisus*) and the Gunnison sagegrouse. On Friday, Roger Rosentrater (BLM State Plant Ecologist, Idaho) will lead an introductory workshop addressing lichen/microbiotic soil crusts. The regular Saturday program is being planned to include oral presentations considering: the nature and distribution of sagebrush communities in Colorado (Dr. Durant McArthur, USFS Shrub Sciences Laboratory); common wildflowers of the Gunnison Basin; lichen/microbiotic soil crusts of sagebrush ecosystems; threatened and endangered plants of sagebrush ecosystems; native plants for landscaping; paleo/ethnobotany of sagebrush communities on the western slope of Colorado; restoration of sagebrush communities; and habitat requirements for Gunnison sagegrouse. On Sunday, a workshop is tentatively planned to address sagebrush identification, lichen/microbiotic soil crust identification, and common plants of sagebrush communities in the Gunnison Basin. Field trips are being planned to a local paleobotany site and a sagegrouse lek. Paula Lehr, Kathy Warren, Gretchen VanReyper, and Gay Austin have graciously agreed to co-organize the annual meeting. If you have ideas or input, please contact Paula at 970-641-0671 or Gay Austin at 970-641-6264.

Asclepias unicialis
Artist:
Carolyn Crawford

ANNOUNCEMENTS

From the Board of Directors

Two board meetings have been held since the October 1997 election. The principal topics of discussion at the November 1 meeting included: evaluation of the 1997 annual meeting, status of the Society's newsletter, development of a website, preliminary planning for the 1998 annual meeting, discussion of future annual meeting sites, long-range planning for the Society, and status of committees. A major focus was on creation of a new newsletter/website committee to improve Society communication.

The first board meeting of 1998 was held on January 10. At this meeting, Lisa Tasker was confirmed as the new chair of the Horticulture committee; $150 was authorized to assist in reprinting a brochure on purple loosestrife; and Paula Lehr presented plans for the 1998 annual meeting.

At that meeting, the Plateau Chapter requested guidance on CONPS policy regarding chapter actions on environmental and conservation issues. Chapters are welcome to represent their chapter of the Society in responding to local environmental issues, as long as the issue is directly connected to conservation of native plants or ecosystems. Copies or notification of local chapter actions should be sent to the Secretary of the Society.

The board also initiated long-range planning discussions, which will be continued at subsequent meetings. Board meetings scheduled thus far for 1998 will be held on the following Saturdays: March 7, April 11, May 2, and August 29. Discussions of chapter finances and the role of the education committee will be continued on March 7. The March 7 meeting will convene at 1:00 PM at the City of Boulder Open Space Operations Center at 66 S. Cherryvale Road in Boulder. Please call Jeff Dawson (303-722-6758) if you have any business or announcements to present to the Board at these meetings.

Erigonum coloradense
Artist: Marjorie Leggitt

Native Plant/Revegetation Workshop Held In Crested Butte

Gay Austin, USDA Forest Service
Taylor River-Cebolla Ranger District
Lisa Tasker, Society for Ecological Restoration

The Taylor River-Cebolla Ranger District Forest Service office (Gunnison, Colorado), along with the National Fish and Wildlife Foundation and Colorado State University Cooperative Extension sponsored a Revegetation Workshop in Crested Butte in August 1997. Interest was so extensive that there were 14 co-sponsors with many people being turned away due to space limitations. Instead of 60-75 people showing up for this three-day event, 163 interested folks representing 12 different states and numerous private businesses, as well as state, federal, county, and city agencies were greeted!

Presenters included botanists, ecologists, and geneticists, as well as a natural resource specialist, an erosion control specialist, and an Arizona rancher. Many different avenues for using native plants in revegetation were explored; these ranged from maintaining local native gene pools to using cows to help revegetate mine tailings. To many participants, just the two days of networking made it all worthwhile! Some conclusions from the workshop follow.

1) There are two general perspectives regarding plant materials for revegetation — neither can be labelled "right" or "wrong" (A. Kratz, Regional Office, USDA Forest Service).

The agricultural perspective seeks plant materials that will grow very well at a site, and stop or minimize erosion. Materials selected may include native plants, cultivars of natives, or non-natives. Rhizomatous grasses are often favored for their ability to form good ground cover, and legumes may be added as nitrogen fixers to promote growth of the grasses. Forage value for livestock or wildlife may also be a consideration.

The ecological perspective seeks to maintain the biological, and often also genetic composition of the ecosystem within which the disturbed site occurs. Not only must selected plants be suited to the site and stop or minimize erosion, they must also be natural parts of the ecological web. Materials selected will likely be the same native plants found in relatively undisturbed areas adjacent to the site, or might be early successional ("pioneer") plants associated with the native plant community. Non-native plants might be used if they will not persist at the site, but yield it to native species seeding in from adjacent areas over a reasonable period of time. Non-native species that tend to be invasive in the local ecosystem would clearly not be used. Some people with an ecological perspective would go so far as to seek local native plant materials, rather than the same species originating from a distance, so as not to introduce novel genes into local populations. In

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CHAPTER NEWS

Metro-Denver Chapter

Monthly meetings are held at the Denver Botanic Gardens (DBG) at 7:30 PM. Meetings for the rest of the Spring will be in the Morrison Center.

February 24 - The Central Shortgrass Prairie Ecosystem Project, Betsy Neely
The Nature Conservancy, and partners in seven plain states are working together to develop a biological assessment of the Central Shortgrass Prairie to ensure the long term survival of all viable native plant species and community types within this ecoregion. Betsy Neely, Director of Conservation Planning at the Colorado Field Office and team leader of the Central Shortgrass Prairie Project will give an overview of this effort.

March 24 - Winter Drought and High-Elevation Conifers in Colorado: How do They Cope? Rick Boyce
Winter is a time of drought for plants. While there may be a lot of water on the ground in the form of snow, it is frozen and unavailable to plants. Deciduous plants avoid this problem by dropping their leaves in the fall so they lose little water during the winter. Conifers, however, must keep their foliage alive. Rick Boyce, at the University of Denver will talk about the adaptions conifers have made to minimize water losses in winter, and how they replace the losses that occur. Bristlecone pine, Englemann spruce and subalpine fir, all species which grow in the high mountain forest of Colorado will be the focus of this talk.

April 28 - Wetlands of South Park, John Sandersen
More information will be published regarding this subject.

Boulder Chapter

All indoor meetings will be held at Foothills Nature Center in North Boulder at 7:30 PM. For more information, call 303-666-8348 or 303-665-6903.

March 12 - Plants and Ecology of the San Juans, Bob Powell
The San Juan Mountains in southwestern Colorado vary widely in geologic history, topography, soils, and rainfall, and therefore in scenic appearance and distribution of plants. Slides of different plants and typical scenes will be shown for areas ranging from Cubres Pass (southwest of the San Luis Valley) to the western foothills near Utah.

April 9 - Inspired by Nature: Learning from our Most Enchanting Natural Landscapes, Jim Knopf
Not to be missed! Jim is a landscape architect and a well-known author on xeriscaping. His upcoming book, *The Waterwise Tree, Shrub, and Vine Companion,* will soon be published by Johnson Publishing, Boulder.

May 4 - Picnic and hike (Place and time to be announced)

Penstemon scariosus var. *albifluvis*
Artist: Kaye Thorne

Plateau Chapter

We had an inspiring potluck and annual meeting in November at the USFS office in Delta, coming up with many ideas on chapter activities, workshops, and field trips. A discussion on improving event publicity resulted in the appointment of several people to place the events in the local media, and help contact members. These contact people, and their areas: Grand Junction, Bob Clark 970-242-8067; Delta, Evelyn Horn 970-835-8391; Gunnison, Kathy Warren 970-349-0743; Montrose/Ouray, Amanda Clements.

To address the issues of endorsement and involvement with local native plant and habitat programs and legislation, we discussed the formation of a steering committee, so that when a proposal comes up, our chapter of CONPS can discuss the issue and lend CONPS endorsement and feedback to specific initiatives. Several members volunteered to be on this committee.

Finally, we came up with ideas for 1998 workshops and field trips which follow. Please call trip leaders to register for trips ahead of time

March (date pending) - Rare Plant Monitoring Workshop, Coordinator Peggy Lyon 970-241-8321
This will be the introductory session for an ongoing effort to monitor several rare plants on the Western Slope, and will be combined with field trips later in the season around Mesa County. Janet Coles of the Colorado Native Areas Program will show us monitoring methods in this workshop. We should have a date and location-set up by February, give Peggy a call.

April 25 - Rare Plants of Delta County, Leader Peggy Lyon 970-241-8321
Several populations of rare plants were discovered by Peggy during her '97 inventory of Delta County. If you have never seen *Lomatium conoinnum, Eriogonum pelinophilum,* or some of our other unusual plants, this is an excellent opportunity.

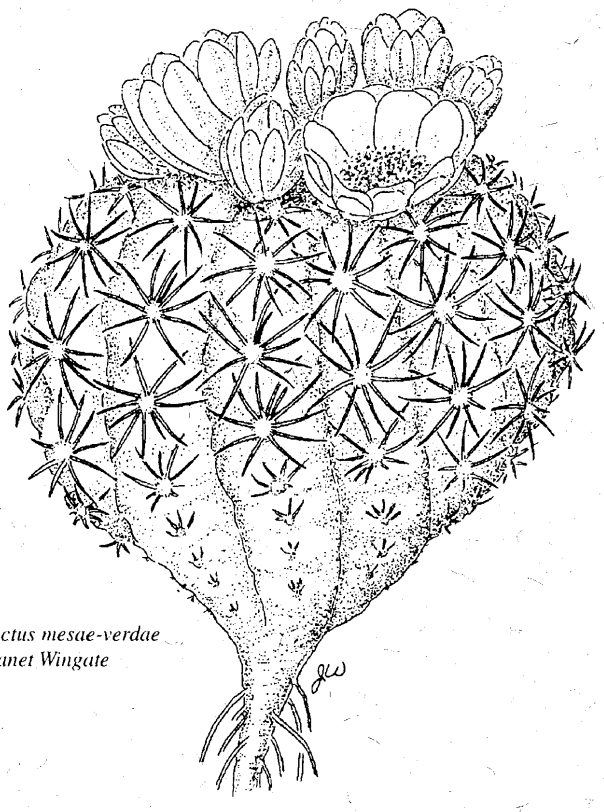
CHAPTER NEWS

Chapter News continued

May 10 - Montrose Adobes Field Trip, Amanda Clements 970-248-3564.
Come see the adobes in bloom, always a lot of interesting plants, good introduction to a very specialized habitat. Meet at 9:30 AM at the downtown City Market parking lot.

May 29 - Buffalo Creek Lichen/Macrobiotic Soil Crust Field Trip, near Bailey, Coordinator Gay Austin 970-841-6264 home or 970-641-0471 work. Cost $5 members, $10 non-members.

May 30-31 - Lichen/Macrobiotic Soil Crust Workshop and Field Trip, Gunnison. Coordinator, same as above, cost $20 members, $25 non-members.
Dr. Larry St. Clair from Brigham Young University will lead these events, looking at cryptogamic soil crusts, crust ecology, and lichens. The two day Gunnison workshop will include one day in the lab with scopes, and one day in the field.



Sclerocactus mesae-verdae
Artist: Janet Wingate

Southwest Chapter

April 8 - The Plants of Anasazi Lands, Dick Moseley
Come join Dick Moseley in his slide presentation of the native plants of the Chimney Rock area. Location: Fort Lewis College, Noble Hall Room 125.

May 9-10 - Flora of the Hovenweep Ruins, Leader: Leslie Stewart
Meet at the Hovenweep Ranger Station at 10 am on May 9th. Plan to camp at the Hovenweep ruins. Please contact Leslie Stewart at 970-882-7241 if you plan on attending. Location: Hovenweep National Monument.

Continued from page 4

that light, preference might be given to non-persistent exotics over non-local native species in the hope that there will be less long-term alteration of the local ecosystem after the exotics drop out. There is concern that once novel genes are introduced to the local native plant population, they cannot be recalled. Some people with an agricultural perspective might consider the introduction of non-local genetic material to be a potential improvement in the local ecosystem, which would sort out over time under natural selective pressures.

2) According to three geneticists present at the workshop, we need to address concerns about gene pool pollution and the maintenance of genetic diversity. It is better to err on the safe side by trying to use plant materials collected as close to the site to be revegetated as possible, or to have "local native plant seed" grown out at a nursery using methods differing from those used with normal seed production. The concern was that non-local natives, or cultivars of natives, might introduce genetic adaptations that would not otherwise exist in the local ecosystem; these may affect local native populations detrimentally. Other choices to avoid "gene pool pollution" were to avoid seeding at all, or to seed with non-native, annual, non-persistent seed to allow local natives to recolonize a disturbed site; there were some concerns here.

3) Introduced, exotic plant species such as smooth brome, crested wheatgrass, and orchard grass have been used extensively in the past. Research has shown these species to be invasive, as well as aggressive in their replacement of native plant species and native plant communities (J. Connor, Rocky Mountain National Park).

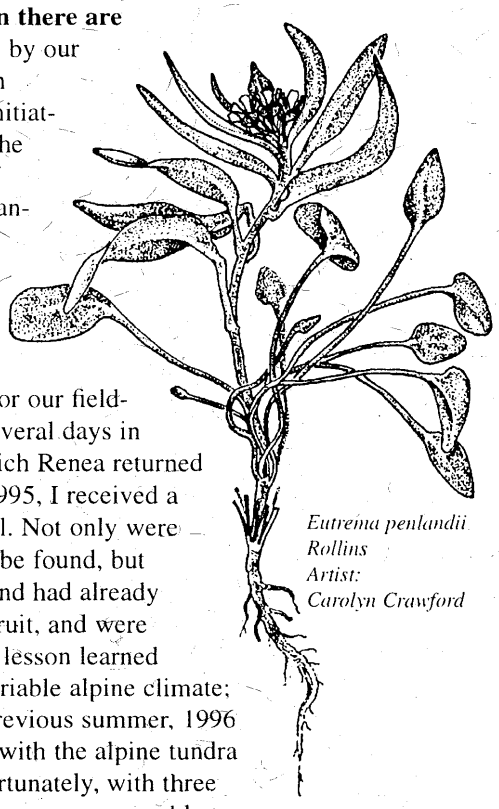
4) Disturbed sites should be considered individually. In the past, reseeding may have been recommended too quickly, when a site with adequate soil moisture and nutrients may have had its own "bank" of local native seeds. In the case where there is a population of threatened, endangered, or sensitive plants nearby that could be potentially negatively impacted by reseeding choices, not reseeding at all or using locally collected native plant seeds were deemed to be better strategies.

Perhaps more questions than answers were produced about native plants and revegetation, but the workshop was successful. It brought together people of wide backgrounds and perspectives to hear the science, the experiences, and the beliefs surrounding the issues of native plants and revegetation.

Continued from page 1

They're huge! In July of 1996, Renea, her husband Brad, and I traveled to Alaska in search of *E. edwardsii*. Equipped with herbarium notes and guidance from Dr. David Murray at the University of Alaska Museum, as well as a GPS unit and maps (although not enough warm clothing), we forged our way into the White Mountains northeast of Fairbanks. The search image that we had formed for *Eutrema* in Colorado misguided us. Anticipating diminutive plants, we were not expecting the Amazonian plants that surprised us. We successfully located three populations on the wind-swept slopes of Eagle Summit and Twelve Mile Summit, collecting stems with numerous large leaves, as well as the diagnostic four-angled fruits. However, thwarted by imprecise collection information and strict Federal regulations, our efforts elsewhere in Alaska were unsuccessful. Nonetheless, the trip was a bonafide success.

What do you mean there are no plants? Buoyed by our accomplishments in Alaska, Renea re-initiated her research in the Mosquito Range of Colorado. By all standards—our field notes from the previous season—early to mid-August should have been perfect for our fieldwork. Following several days in the field during which Renea returned to sites visited in 1995, I received a panicked phone call. Not only were there few plants to be found, but those that were found had already flowered, gone to fruit, and were senescing. Another lesson learned about the highly variable alpine climate; in contrast to the previous summer, 1996 was dry and warm with the alpine tundra crisp underfoot. Fortunately, with three additional pairs of eyes, we were able to find and collect leaf tissue from the rapidly declining plants.



Eutrema penlandii
Rollins
Artist:
Carolyn Crawford

Renea spent the next five months in my Plant Systematics Laboratory at CU-Denver preparing buffers, performing extractions, separating proteins, and collecting the much-desired and anticipated genetic data. The analyses yielded many interesting results!

What do you mean there's no genetic variation? The Penland alpine fen mustard harbors little genetic variation both at the population and species level in comparison to all other plants for which these data are available. This includes its sister species, *E. edwardsii*, which maintains up to five times as much genetic variation as *E. penlandii*. This paucity of genetic variability is particularly surprising as the Penland alpine fen mustard is polyploid with twice as many copies of genes as diploid species; polyploid species have been shown previously to harbor levels of genetic diversity higher than diploid species.

Populations of *E. penlandii* also maintain less genetic diversity than does the species as a whole. These data reveal a loss of genetic diversity due to population subdivision providing strong evidence implicating the disruptive influence of one or more evolutionary forces. *Eutrema penlandii* also harbors less genetic variation in comparison to other endemic species. In contrast to expectations, many endemics have been shown to exhibit relatively high levels of genetic diversity despite a restricted geographic distribution. This is apparently not true for *E. penlandii*, which can be considered an extremely narrow endemic with an island-like distribution.

These data provide evidence supporting three explanations for the low levels of genetic diversity observed in *E. penlandii*: inbreeding, random genetic drift, and recent evolutionary origin. None of these explanations may be excluded, and possibly all have played a role in the evolutionary history of these populations and of this species.

They're different! Renea's genetic data clearly reveal that the two North American *Eutrema* species are genetically distinct. While these data further support the hypothesis of a close taxonomic affinity of *E. penlandii* and *E. edwardsii*, it is not yet entirely clear at what level: species, subspecies, or variety. While both taxa clearly derive from a common ancestor or closely related ancestors, they do not exhibit a progenitor-derivative relationship.

This research makes several important contributions to the conservation and protection of rare and sensitive plants. First, while numerous studies have been published describing population genetic variation in rare species, few have addressed species as rare as *E. penlandii*, and fewer still have examined rare alpine species. Second, the population structure and genetic diversity data provide valuable information useful to the preservation and conservation of known populations of this rare mustard. Given the discontinuous distribution of *E. penlandii* populations, it is not surprising that we have identified genetic subdivision. However, these data provide additional insight into those populations that are most sensitive genetically to disturbance and further subdivision. Finally, due to the common occurrence of *E. penlandii* with other sensitive species, these data may be applied to an understanding of the population genetics and evolutionary biology of these species, as well.

Acknowledgment. We gratefully acknowledge the John Marr Fund of the Colorado Native Plant Society which provided funding toward completion of this research. We would like to thank Janet Coles (Colorado Natural Areas Program), Lee Carlson and Jan McKee (US Fish and Wildlife Service), and Tass Kelso (Colorado College) for assistance with this research. We also thank undergraduates Sara E. Hill, Alicia Esparza-Webster, and Michael A. Von Hofwegen from the Department of Biology at The University of Colorado at Denver, as well as the indefatigable Brad Hardwick, for assistance in the field and laboratory.

CALENDAR OVERVIEW

CHAPTER MEETINGS

Metro-Denver Chapter

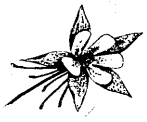
Feb 24	Central Shortgrass Prairie Ecosystem
Mar 24	Winter Drought and High-Elevation Conifers in Colorado
Apr 28	Wetlands of South Park

Boulder Chapter

Mar 12	Plants and Ecology of the San Juans
Apr 8	The Plants of Anasazi Lands
Apr 9	Inspired by Nature
May 4	Picnic and hike

FIELD TRIPS AND WORKSHOPS

Feb 21	Colorado Penstemons Second Session: February 22 Third Session: March 7 Fourth Session: Sunday, March 8, 1998
Mar	Rare Plant Monitoring Workshop (date pending)
Mar 21	Early Spring Wildflowers Second Session: March 22, Third Session: not yet scheduled
Apr 18	Weeds Second Session: April 19 Third Session: April 4
Aprl 25	Rare Plants of Delta County
May 9-10	Flora of the Hovenweep Ruins
May 9	Update on Asclepias Classroom Session: Saturday, May 9, 1998 Field Session: Sunday, May 10, 1998
May 10	Montrose Adobes Field Trip
May 29	Buffalo Creek Lichen/Macrobiotic Soil Crust
May 30-31	Lichen/Macrobiotic Soil Crust



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