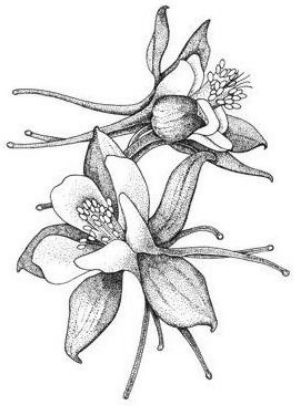
Aquilegia

Newsletter of the Colorado Native Plant Society



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

Post-Consumer Recycled Paper – Questionable Benefits

by John Giordanengo

As a member of CoNPS, it is your right to question the conservation practices adhered to by the directors that serve you. One of the most resource-consuming products CoNPS produces is the beloved *Aquilegia*. As consumers of the world continue to increase demand for post-consumer recycled paper (that is, made from paper that was deposited by you into a recycling container), the reduced market for tree-based paper becomes an ever-important element of forest conservation. However, beyond the issue of *number of trees consumed*, the decision to use recycled paper or virgin paper (that is, made from trees, with no recycled content) also impacts global warming, energy consumption, landfill space, water consumption, and pollution.

The costs associated with these environmental impacts are often a result of the consumers' personal values, which are partially a reflection of the environment in which they live. For instance, if you live in a desert, you are more likely to view durable plates as having a higher environmental cost, due to washing, than the use of paper plates. If you live in an area that suffers from severe logging, but has an abundance of water, you might view paper plates as having a higher environmental cost. In an attempt to remove personal bias from the decision-making process, life cycle analysis is often used to determine the net environmental costs associated with various consumption alternatives. However, inadequate data and oversimplified models are two of the biggest limitations of life cycle analyses. Below is a list of the environmental trade-offs between using post-consumer recycled paper relative to virgin paper. These findings are based on a review of the literature (including life cycle analyses) and six years of professional experience working in the recycling industry:

- **Number of Trees Used**: It is clear that recycled paper uses fewer trees than virgin paper, thus lessening demand on forests. In turn, recycled paper increases the potential for conserving biodiversity around the world and maintaining healthy watersheds.
- **Landfill Space**: Using recycled paper reduces the amount of waste going to landfills by providing a market for recycled materials.

"**Recycled Paper**" continues on page 2

Contents

"**Recycled Paper**" continued from page 1

- **Energy**: Most of the reports that I found indicate the production of recycled paper uses less energy than virgin paper, but the energy used tends to come more from fossil fuels.
- **Greenhouse Gases**: It is not clear how recycled paper use relates to CO^2 sources and sinks, since the complexities of that issue are beyond the scope of this report.
- **Pollution (air and water):** State of knowledge is inadequate.
- **Water Consumption**: Although my professional experience suggests that the production of recycled paper consumes less water than the production of virgin paper, there is little evidence from the literature to support or deny this claim.

THE BOTTOM LINE... consumers are encouraged to reduce their overall consumption of paper (virgin or recycled). When paper is necessary, choose post-consumer recycled content when possible to lower your environmental impact.

If you are aware of additional research findings on this issue, please send them to the Board of Directors for review. In an effort to reduce the environmental impact of *Aquilegia*, we will maintain a policy on the use of paper that reflects the best available knowledge. In the mean time, we are proud to say that *Aquilegia* is printed on 100% recycled paper, minimum 30% post-consumer content. If you would like to receive *Aquilegia* electronically, please contact Eric Lane by e-mail at: eric.lane@ag.state.co.us

John Giordanengo is a Director of the Board for the Colorado Native Plant Society and Project Director for Wildlands Restoration Volunteers.

2009 SOCIETY WORKSHOPS

"Grow" your knowledge by attending one of our upcoming workshops. There are still a few places available in February's workshop on *Astragalus*, as well as April's workshop emphasizing select grass genera. To really expand your knowledge of plants, why not try the March workshop on ferns, mosses and liverworts? Vickey Trammel will provide an introduction to their form, life cycles, and identification. And as the new wildflower season springs forth under our warm sun, Mary Ann Bonnel will introduce wildflower identification using taxonomic keys. What better way for a budding botanist to start down this new path? For details, see *Aquilegia* 32(3) or www.CoNPS.org.

ASTOUNDING *ASTRAGALUS* IN COLORADO

Leader: Jennifer Ackerfield
Location: Colorado State University, Fort Collins, CO
Time: 9:00 am to 3:00 PM
Session One: Saturday, 7 February 2009
Session Two: Sunday, 8 February 2009

THE STRANGE LIFE OF MOSSES, FERNS, AND HORSETAILS

Leader: Vickey Trammell
Location: Arapahoe Community College, Littleton, CO
Time: 9:00 am to 1:00 PM
Session One: Saturday, 14 March 2009
Session Two: Sunday, 15 March 2009
Optional: Afternoon trips to Denver Botanic Gardens

"INTERESTING" GRASS GENERA

Leader: Robert Shaw, author of *Colorado Grasses*
Location: Fort Collins, CO (location TBA)
Time: 9:00 am to 3:00 PM
Session One: Saturday, 25 April 2009
Session Two: Sunday, 26 April 26 2009

BASIC WILDFLOWER IDENTIFICATION

Leader: Mary Ann Bonnell
Location: Morrison Nature Center at Star K Ranch, Aurora
Time: 9:00 am – 3:00 PM
Session One: Saturday, 2 May 2009
Session Two: Sunday, 3 May 2009

To register, mail your check payable to CoNPS ($20 per workshop session) along with the registration form from our website. Or send your check with the title and date of desired workshop(s), your name, address, telephone number, and email address to:

CoNPS c/o Linda Smith
6822 Mission Rd,
Colorado Springs, CO 80915.

Workshop Hosts Needed

Hosts are still needed for Barry Johnston's Wetlands workshop on 23-24 January and Mary Ann Bonnell's Basic Wildflower Identification workshop on 2-3 May. Call Ann Henson at 303-772-8962, if you are able to volunteer.

MARR AND STEINKAMP GRANT REPORTS

Demographic Monitoring of the Cliff Palace Milkvetch (*Astragalus deterior*): Burned vs. Unburned Populations in Mesa Verde National Park

by Lynn Moore

Astragalus deterior (Barneby) Barneby (Cliff Palace milkvetch) is an endemic species known to occur in Mesa Verde National Park (MEVE). Mesa Verde has experienced six large fires since 1989, of which several affected known populations of *A. deterior*. The Natural Resource Office personnel at MEVE wanted to compare population dynamics between burned and unburned occurrences at different geographic locations across the park. To help answer the question of how fire impacts the life history of *A. deterior*, 11 permanent belt-transects were established in burned and unburned sampling sites.

Astragalus deterior is a small, caespitose, more or less short-lived perennial. It was first described by R. C. Barneby from a Mesa Verde collection in 1948. It is readily recognized by the small, narrow, slightly folded leaves with a grayish-green color due to the strigulose pubescence. The flowers are most often lilac colored, although creamy (ochroleucous) flowers do occur. The fruits are more or less long and narrow, incurved, mottled with purplish spots, and scattered with short strigose hairs. The original description of this taxon describes the flowers as ochroleucous, but most field observations reveal lilac colored flowers.

Astragalus deterior is generally found on mesa tops and rims, often in depressions and areas surrounding the bedrock where soils are shallow and competition from other plants is low. It is exclusively found on the poorly developed, young, loose, sandy soils derived from the white beach deposit of the Upper Cliff House Formation. These soils are produced from erosion activities of wind or from run-off filling cracks with loose sandy soils. *Astragalus deterior* is typically found in undisturbed mature piñon/juniper dominated vegetation.

Methods. Monitoring of *Astragalus deterior* involved establishing 11-baseline permanent belt transects in select areas within the Park. Study design and sampling methodology followed (Lesica 1987). The length and placement of transects were selected to encompass as many individuals as possible within plots. This is a qualitative study using discrete data to track the fate of individuals in burned and unburned habitat. Sampling occurred in mid-June of 2003 and in mid-May of 2004, 2005, and 2007. Sampling did not occur in 2006.

Stage classes were established as follows: seed bank (new individuals, offspring of mature-reproductive), seedling (less than or equal to 1 to 2 leaves), non-reproductive (greater than or equal to 3 leaves, no flowers or fruit), mature-reproductive (flowers and/or fruit), and dead (absent or dead stems etc.). Transition data were recorded for individual plants. In all cases, a transition state was assigned based upon a change of state from one stage class into another stage class (Elzinga et al. 1998).

Numbers of individuals were tabulated for each year and each transition. Graphs were constructed to show the total stage class distribution for each year and to compare percentages between the burned and unburned stage class distributions for each year. An average of the 2004, 2005, and 2007 transitions was calculated and used to construct a life cycle diagram as per Caswell (2001) for the total, burned and unburned transects. Net reproductive rate, survivorship, cohort tables, mortality, and mortality rate, are not presented herein; however, the full report, which includes these data, is available from the author or from the Natural Resource Office at Mesa Verde National Park (Moore 2008).

Astragalus deterior. From Lynn Moore.

Results. Four years of sampling tracked 902 individual plants; 409 of these occurred in burned areas and 493 in unburned sites (Fig. 1). The largest number of individuals was observed during the 2004 field season, with 2007 showing the highest number of seedlings. The fewest mature-reproductive individuals were observed in 2003 and in 2007, which may be attributed to the late sampling time in 2003 and several late snowfall events in April 2007.

To investigate the effects of fire, two similar stage class distribution bar graphs were constructed comparing percent of individuals per stage class and year in burned and unburned sites (Fig. 2-3). In unburned sites, both the non-reproductive and seedling stage classes represent 30%

"**Astragalus**" continues on page 4

"**Astragalus**" continued from page 3

or more of the total across all four years of sampling (Fig. 2). The mature-reproductive stage class made up 24% or less of the populations during the same period. There is a gradual decrease in non-reproductive individuals and a gradual increase in seedlings across all four years. The mature-reproductive stage class distribution showed a gradual increase in 2004 and 2005, followed by a decrease in 2007. The low mature-reproductive percentages may be due to late sampling time, as in the case of 2003, and possible delayed flowering due to late snow fall, as in the case of 2007 mature-reproductive.

In the burned sites (Fig. 3), non-reproductive plants make up 30% or more of the total, similar to unburned areas. Seedling distribution in the burned sites is more variable than in unburned areas. Three of the sampling years showed 25% or less of the total to be seedlings, with a spike of 52% in 2007. The mature-reproductive stage class distribution in the burned site was similar to the unburned, showing a gradual increase in 2004 and 2005, followed by a decrease in 2007.

A life cycle diagram constructed as per Caswell (2001) shows that seedlings and the non-reproductive stage have a 22% and 28% chance of death, respectively (Fig. 4). It also shows that mature-reproductive individuals can transition back to non-reproductive and have almost the same chance of staying reproductive. Recruitment is shown by the 71% probability of mature-reproductive individuals contributing seeds to the seed bank. The seed bank has a 35% chance of producing seedlings, a 28% chance of producing non-reproductive individuals in one year, and a 7% chance of transitioning to mature-reproductive in one year.

The results show that of the 15 mature-reproductive individuals recorded in 2003 (Fig. 1), none lived to 2007. Three of these lived to be mature in 2005, indicating an age of at least two years. The 2007 data provided more clarity for determining life span. None of the above three individuals survived to 2007. Only two individuals out of 902 were accounted for in all four sampling years. These two individuals were both non-reproductive in 2003, possibly germinating earlier that year. One individual remained non-reproductive in 2004 and then transitioned to mature reproductive in 2005 and 2007, while the other individual transitioned to mature reproductive in 2004 and remained reproductive in 2005 and 2007. A graph illustrating the life span of individuals tracked in this study shows that most

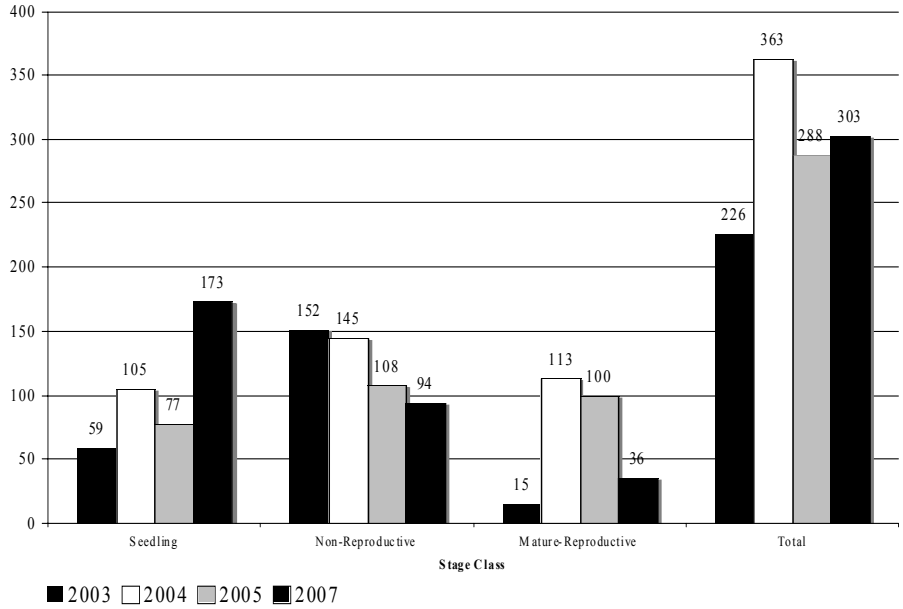


Figure 1. Bar graph showing the number of *Astragalus deterior* individuals by stage class distribution each, as well as the total.

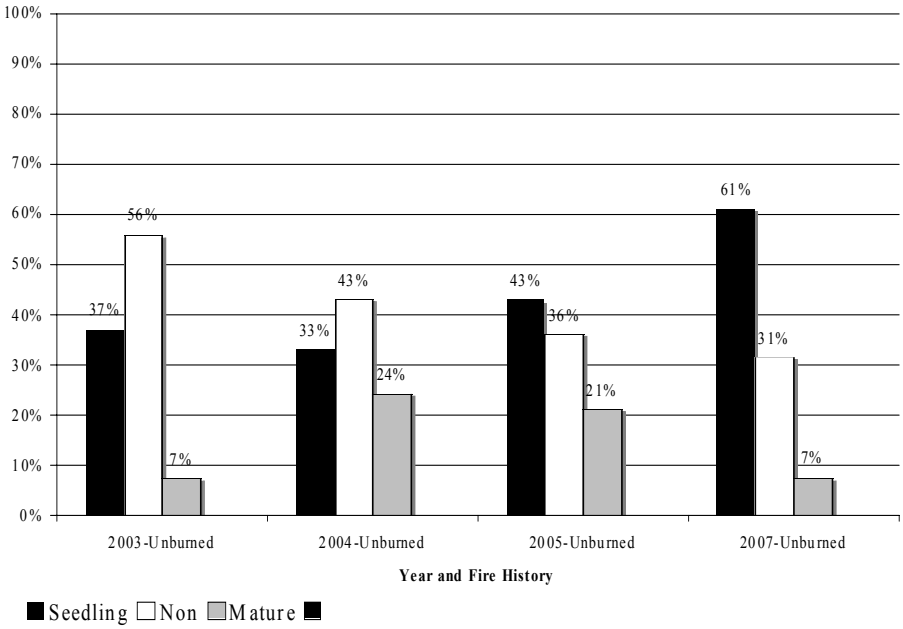


Figure 2. Percent *Astragalus deterior* individuals per stage class by year in unburned sites.

plants lived less than a year (Fig. 5). Individuals that lived one year began to reproduce and those that lived two years showed the highest incidence of reproduction. Very few plants lived to be three or four years old, with those that did flowering and setting fruit.

Discussion: Several things become clear from these analyses. First, seedling mortality is very high for this taxon, especially in burned areas. This could be due to increased exposure from sun (less shading from surrounding trees or shrubs) or sterilization of the substrate and removal of duff and organic matter, resulting in an overall decrease in the water holding capacity of the soils. Residual nutrients from the fires may negatively affect seedling germination and/or establishment. Additionally, invasive ephemerals and aggressive perennials may occupy sites that were typically open for seedling establishment before the fires. Seedling numbers were high in 2007 in both burned and unburned samples, most likely due to the increased moisture that occurred as late snowfall immediately before the May sampling period. A second sampling later in 2007 would have clarified this high seedling result by verifying survivorship.

Seed bank dynamics are a critical stage in the life history of this taxon. It is not known how long seeds are viable, or what percentage of seeds germinates; however, much can be deduced from the data resulting from this study. Strong canyon winds may disperse the seeds, but it is also likely that rodents or insects play an important role in seed dispersal. Most seeds are likely dispersed within close proximity to the parent plant and remain in the soil until germination. The observations recorded in this study indicate that optimal conditions for seedling germination are not necessarily optimal conditions

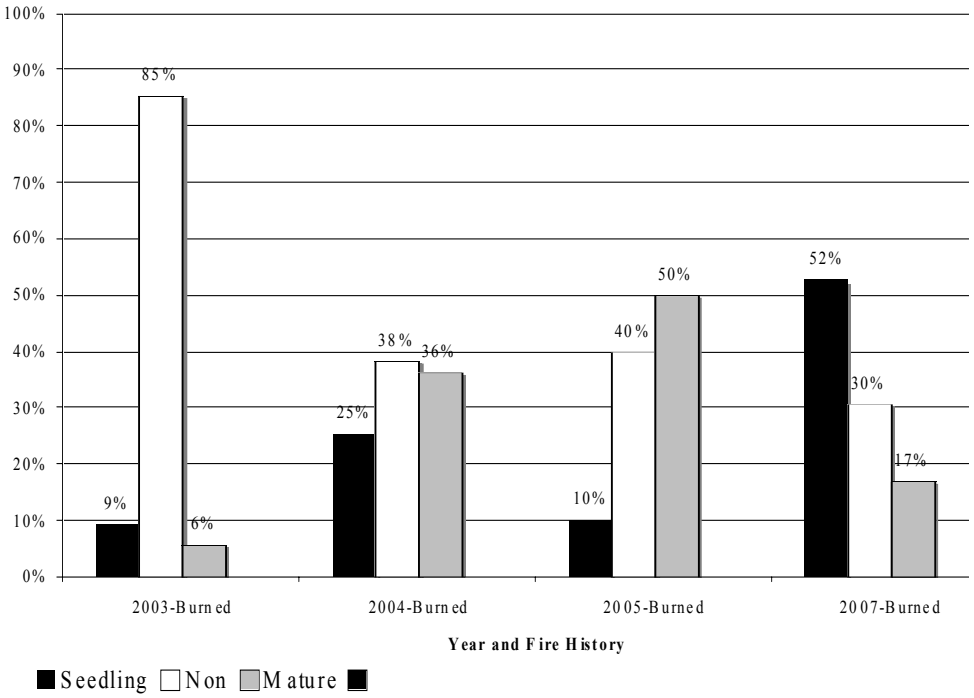


Figure 3. Percent *Astragalus deterior* individuals per stage class by year in burned sites.

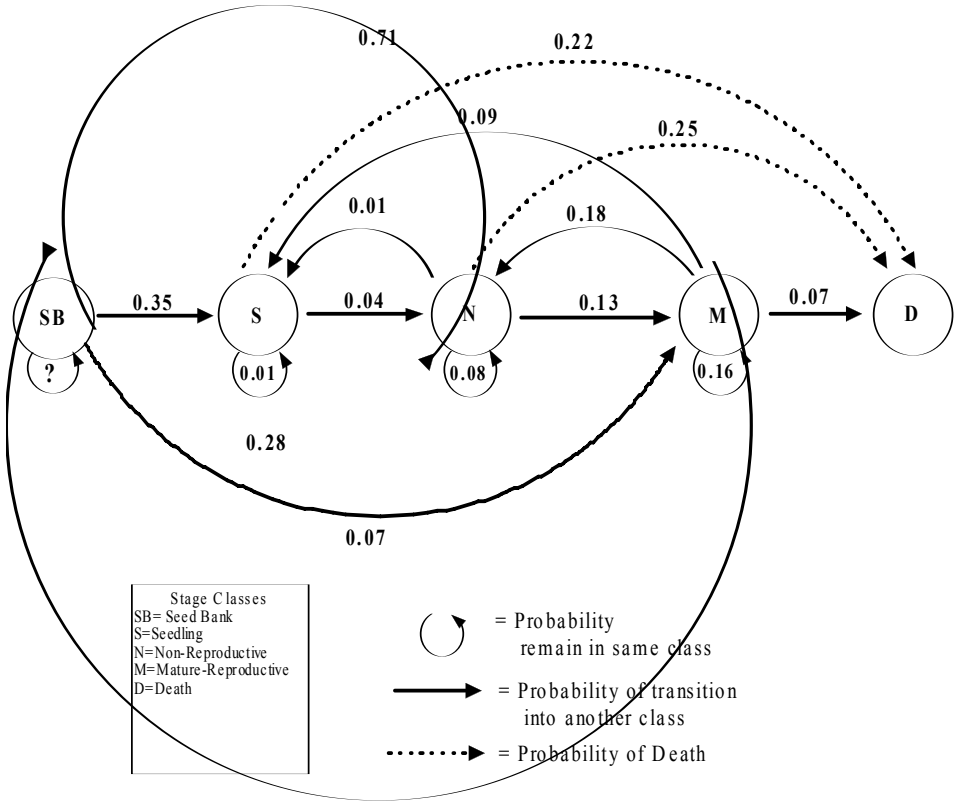


Figure 4. Life cycle diagram of *Astragalus deterior* as per Caswell (2001) indicating the probability of an individual moving into another class.

"Astragalus" continues on page 6

"**Astragalus**" continued from page 5

for seedling establishment. One particular plot located on Long Mesa was extremely productive, with large numbers of seedlings observed every year; yet very few, if any, lived to reproduce. This plot is located in a shaded area with soils possessing moisture holding organic matter. This would be very helpful for germination but, by the time the plants reach the next life stage, shade and increased organic matter tend to discourage establishment of larger plants. This taxon is a poor competitor and has roots consisting of a deeply rooted, branched caudex. It is not capable of vegetative reproduction and shaded, crowded areas would likely work against an individual's ability to out compete other aggressive species or itself.

There is no identifiable trend as to whether the *A. deterior* populations are decreasing or increasing (Moore 2008). Survivorship of young *A. deterior* plants is very precarious. This survivorship is affected by site characteristics and seems to be mostly influenced by spring moisture, as well as substrate conditions (that is, presence of water holding organic matter and duff). Fires change the substrate and decrease the number of sites with optimum conditions for seed germination and seedling establishment. It is apparent that *A. deterior* is not a good competitor and fires tend to encourage fierce competition between plant species. The individuals that survived the fires through deep root systems, protection by sandstone pavement, relatively low fuel load, or sheer luck were able to come back and compete through large size and robust vigor. Observations in the field showed that mature-reproductive individuals were more numerous, larger, and more robust in the burned areas, possibly due to the influx of nutrients following a fire. However, this

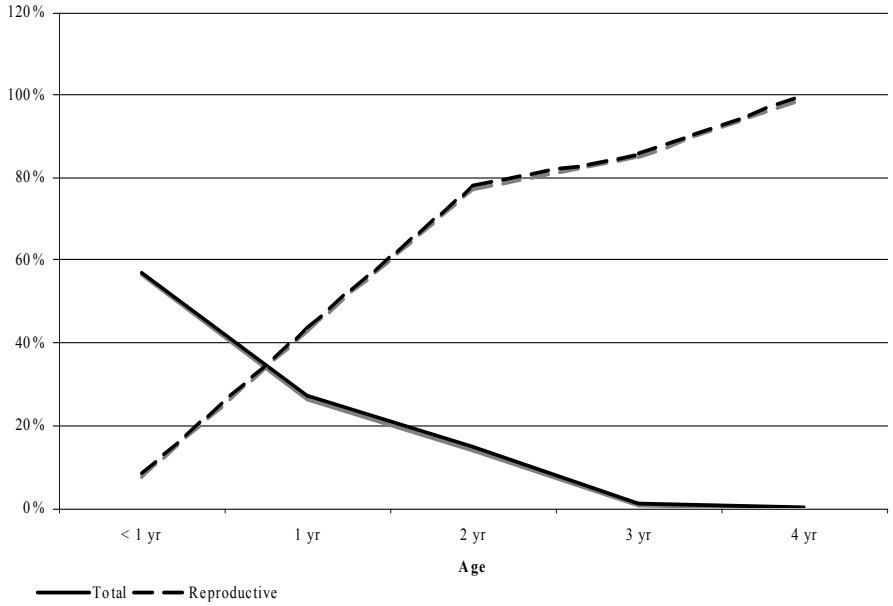


Figure 5. Percent of total and reproductive *Astragalus deterior* individuals by age class.

is not a long-lived perennial and, unless new seedlings are successful in establishing new individuals, the temporary gains from fire are short lived.

Astragalus deterior success is seed bank dependent. A good flowering year, such as that seen in 2004, can produce many seeds in both burned and unburned sites. A wet period may produce large numbers of seedlings, where approximately 60% of these will live less than one year. If individuals live to the next year, approximately 44% of those individuals may reproduce. Only 27% of seedlings may live to be two years old, but if they do, 78% of them will reproduce. Very few plants live to be three or four years old, but those that do survive will likely reproduce.

Astragalus deterior is fortunate to occur within MEVE. The Park's mission to protect ancient puebloan sites also affords protection to the flora and fauna within the Park. Risk assessment for *A. deterior* should be focused on natural occurring threats, for which it would be worthwhile to maintain the permanent belt transects. Climate change may be a future threat for this species; indeed, all endemics with specialized habitats may be at risk. Fire will be a continued threat, especially in light of climate warming. The intensity of the fire is critical in assessing impacts to *A. deterior*. Several subpopulations were extirpated following the intense Long Mesa Fire (2002); I was unable to locate them for the purpose of establishing a belt transect for this study. The loss of future populations to wildfire will depend upon fuel load and any other number of fire related variables. The good news is that *A. deterior* is likely to persist under the attentive management of the Natural Resource Office at MEVE.

Acknowledgments: I would like to thank the Southern Colorado Plateau Network and the Colorado Native Plant Society Steinkamp Fund for funding this research project. I am also indebted forever to Marilyn Colyer and George San Miguel of the Natural Resource Office, Mesa Verde National Park for their support and friendship throughout this lengthy process. Jan Loechell Turner and Leo P. Bruederle were helpful in preparing this report for publication.

Literature Cited

Caswell, H. 2001. *Matrix population models*, 2nd edition. Sinauer Associates Inc., Sunderland.

Elzinga, C. L., D. W. Salzer, and J. W. Willoughby. 1998. *Measuring & Monitoring Plant Populations.* BLM/RS/ST-98/005+1730, U.S. Department of the Interior, Bureau of Land Management, National Applied Resource Sciences Center, Denver, Colorado.

Lesica, P. 1987. A technique for monitoring nonrhizomatous, perennial plant species in permanent belt transects. *Natural Areas Journal* 7:65-68.

Moore, L. M. 2008. Demographic monitoring of the cliff palace milkvetch (*Astragalus deterior* (Barneby) Barneby): burned vs. unburned populations, Mesa Verde National Park, Southwestern Colorado. Prepared for the Natural Resource Office, Mesa Verde National Park.

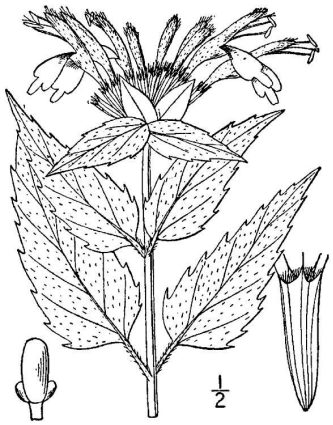
Lynn M. Moore is a botanist with Windom Floristics in Casper, Wyoming.

MICROSCOPE FUND

Members continue to pay off the purchase of the dissecting microscopes with $8 of the $20 workshop registration fee going directly to the Microscope Fund. We have collected approximately 50% of the total purchase price in the past two seasons. You can also contribute directly to the Microscope Fund. Mail contributions with note of the fund payable to CoNPS at P.O. Box 200, Ft. Collins, CO 80522.

The John W. Marr and Myrna P. Steinkamp Funds: Request for Proposals

The Colorado Native Plant Society supports research projects in plant biology from the John W. Marr and Myrna P. Steinkamp funds. These separate funds honor the late Dr. John Marr, Professor at the University of Colorado and the first President of the CoNPS, and Dr. Myrna Steinkamp, a founding member of CoNPS who worked on behalf of the Society for many years in a variety of capacities. Both funds were established to support field or laboratory research on the biology and natural history of Colorado native plants through small grants. The Steinkamp Fund targets rare species and those of conservation concern, specifically.



Mondard Fistulosa
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 3: 132.

Thanks to the generous contributions of many members and supporters, a total of nearly $3,000 is available, although individual awards don't typically exceed $1,000. Recipients of the awards must agree to summarize their studies for publication in *Aquilegia* and on the Society web site. They are highly encouraged to present the results of their research in poster or presentation format at the CoNPS annual meeting and/or a chapter meeting.

CoNPS grants have funded a variety of research projects on Colorado native plants. One project describing pollinator shifts in columbine resulted in an article in the journal *Nature*, while another led to articles on *Physaria bellii* in *Biological Conservation* and in *Conservation Genetics*. Other examples of research funded by CoNPS grants include:

- pollination studies of *Penstemon degeneri* and *Epipactis gigantea*
- monitoring program to determine the effect of global change on alpine plant communities in the San Juan Mountains (part of an international study)
- biogeography and phylogenetics of the *Pyrola picta* species complex
- prairie dogs and harvester ants as disturbance agents on the shortgrass steppe
- soil nutrient heterogeneity and vegetative community composition in wind-disturbed and salvage-logged subalpine forests of Routt County
- chemotype composition of populations of *Monarda fistulosa*

The Board of Directors is now soliciting proposals for a 15 February 2009 deadline. Information on guidelines and requirements for proposals may be obtained by contacting Board member Jan Loechell Turner at jlturner@regis.edu or (303) 458-4262. Alternately, visit our web site: www.conps.org/research_grants.html.

WHO'S IN THAT NAME?

William Weber

by Al Schneider

This is the fourth article in a series entitled "A Discussion with Dr. William Weber." If you have additional questions, send them to Al Schneider at webmaster@conps.org. Al will post Dr. Weber's answers on the Botanical News page at www.CoNPS.org.

Dr. Weber, we understand that you are starting on new editions of your *Colorado Flora*. Many of us use these books constantly in the field and we have notes about new county and state records, thoughts about updates to keys, etc. Where should we send these notes so you can review them for possible inclusion in the new editions? We would very much extend an invitation to anyone to bring us up to date. Send queries to me at bill.weber@colorado.edu. But remember, all additions must be backed up by voucher specimens in the herbarium at CU Boulder (COLO).

What significant changes in families and genera can we anticipate? We will not divide *Senecio* further now, although we feel strongly that the genus is still much too heterogeneous. At 89, I am not able to continue serious work on the vascular plants or the lichens. *Packera* has been accepted (but one can also continue to use *Senecio* for it, if you are not convinced of its distinctness!). The chromosome number of the species, as well as its morphology, are its marks of distinction. And this number is a factor in barring hybridization. In fact, the only true *Senecio* is the little annual weed in the garden. Our woodland species are related to the same group in Europe; the bushy desert-steppe species are probably an endemic American genus. What I called *Ligularia* is probably best put in the Chinese genus *Cremanthodium*. Handel-Mazzetti did not know what to do about these two big Middle Asiatic genera.

We will make few changes in the nomenclature. We will not merge *Lesquerella* with *Physaria*. We will keep the "scrophs" intact, until we are convinced otherwise. But we do not plan to meekly follow all of the treatments in FNA as gospel. Many of them are as radical as you claim that ours are. We intend to have a chapter in the introduction concerning our principles, and will provide short discussions in the text. For example, *Thalictrum heliophilum*, of the oil shales, is not an American endemic. It is not closely related to any of our species. I have collected it in the Altai, and it is actually a Linnean species, *Thalictrum foetidum*, distributed widely in Eurasia. It is not an introduced weed either, but a species disjunct from Asia and justly regarded as rare and endangered in Colorado. You can "Google" a beautiful colored picture of the Linnean type specimen!

We published *Catalog of the Colorado Flora* in 1992. The nomenclatural changes we made or used there are explained in the papers listed under these species or genera in the bibliography. In order to know why these changes were made, you must go to that literature. We continue to make additions and corrections to the catalog, which is now available electronically.

Who were the botanists of the past who most influenced your Colorado flora books? I would say first, Josiah Otis Swift, a self trained naturalist pied piper in New York City, who had an informal club called the Yosians. This group met on weekends for walks in the city parks, where J. Otis held forth (while walking backwards) on all manner of natural history topics, including the mythology, medicinal, taxonomic, and other aspects of Nature. Secondly, Merritt Lyndon Fernald, Harvard University, whom I never met personally, but whose *Gray's Manual of Botany* I used during my formative years in New York and New England. When I was working on the third edition [of the Colorado floras], I relied a great deal on the wisdom and knowledge of Askell and Doris Löve. They were faculty here [at the University of Colorado], Askell an Icelander and Doris a Swede. Both were the pre-eminent cytotaxonomists of the world and were concerned with the

Packera crocata. Copyright Al Schneider (www.swcoloradowildflowers.com).

importance of polyploidy in establishing barriers to hybridization. Askell was one of the prime movers of the *Flora Europaea* and published a book on the plant geography of the Amphiatlantic flora. Doris wrote a still unpublished flora of Mount Washington, New Hampshire. They were the influences that caused me to recognize some of the families that my readers are not used to.

Physaria pulvinata. Copyright Al Schneider (www.swcoloradowildflowers.com).

Do you think any species have become extinct in Colorado since the advent of European settlement? Extinct, no, but possibly extirpated locally in Colorado. *Gentiana andrewsii* was collected once in the Boulder area and has not been seen since. It is not extinct in the eastern U.S., however. Alice Eastwood collected the lichen *Lobaria pulmonaria* in Jefferson County; it has not been seen again. It is an abundant species in the Pacific Northwest. Similarly, *Campanula aparinoides, Astragalus frigidus,* and *Carex pauciflorus* were collected once, but there is no evidence that they have been exterminated. However, the drastic changes in South Park by diverting water to the eastern cities may result in the extirpation of many rarities. It is hard to prove the loss of a species in Colorado, because there is much ground to cover.

Why is the Front Range so full of small populations of eastern North American species? These are relictual species that extended westward to the Rocky Mountains during the Pleistocene and reached the lower canyons, but could not extend any farther except toward the northwest. The drying out of the Great Plains removed the intervening populations, leaving small remnants stranded here. A noteworthy area in which the mixture of Cordilleran, eastern, and northern species still exists as an "island" is the Black Hills of South Dakota and Wyoming.

What do you consider your greatest botanical successes and greatest disappointments? Let's not get into the successes. Greatest disappointment? Not finding the mother lode of a moss, *Leptodon smithii* in Clear Creek Canyon, not known elsewhere in North America. It's there, but a difficult place to cover on foot. It is restricted to calcareous schist.

What have been your contributions to the botanical study of the National Parks and Monuments in Colorado? My students and I collected in all of them and built herbaria and catalogues of their floras. Among the sites that I either started or helped to develop are Dinosaur National Monument, Colorado National Monument, Black Canyon National Monument, Mesa Verde National Park, Rocky Mountain National Park, Great Sand Dunes, Mount Evans-Summit Lake National Botanical Reserve, and the Boulder Mountain Park.

How have you served the international botanical public? I carried out active exchange programs with many institutions around the world. In particular I distributed a formal set (called an *exsiccate*) of 700 lichen herbarium specimens to 60 different herbaria, a total of 42,000 specimens. I instituted studies of the mosses and lichens of the Galapagos Islands in 1964, when there had been virtually no work done there. In 2006, the Charles Darwin Research Station finally hired two resident scientists to carry on the work. In 1967-1968 I worked out of the Australian National University with a colleague on the lichens and bryophyte floras of Australia and highlands of New Guinea and distributed collections to most of the active herbaria in Australasia, Japan, and Finland.

Happy 90th Birthday Bill Weber!

CONSERVATION CORNER

Penstemons and Petroleum: Rare plant protection and energy development can be compatible

by Brian Kurzel

It's no secret that Colorado has seen exponential growth in energy development over recent years. Since 1999, there has been an 800% increase in the number of oil and gas wells permitted per year in our state. Oil and gas exploration and drilling, particularly on the Western Slope, have ramped up and show no signs of slowing down. Given the desire for independence from foreign energy sources, the recent increases in fuel costs, and the potential economic benefits to the state of Colorado, there is general support for additional oil and gas development. However, major concerns arise when this development poses a threat to the flora and fauna of Colorado. From the botanical perspective, it is worrying that at least ten rare plant species may be directly affected by energy development if solutions aren't sought immediately. Conflict seems inevitable, unless conservation and development can find a common ground. Thankfully, a recent project between an energy company and a state conservation agency has proven that cooperative solutions are possible.

At the recent Colorado Conservation Summit, Governor Bill Ritter stated "*we must be stubborn stewards for natural resource protection... but would prefer to work with the energy industry rather than fight them*." In this success story, the 'stubborn steward' was the Colorado Natural Areas Program (CNAP), a conservation program within Colorado State Parks that is the only state agency mandated to work for rare plant protection. The energy industry representative was Oxy USA, which owns private property near Parachute with three out of the four viable

Rare plant habitat on Oxy property. Copyright Andrea Wolfe.

populations of the rare Parachute penstemon (*Penstemon debilis*). This penstemon, which grows only on exposed cliffs of the Green River formation on the edge of the Roan Plateau, is a candidate for listing under the federal Endangered Species Act, and is one of the rarest plants in the state. This same habitat also houses the sun-loving meadowrue (*Thalictrum heliophilum*) and the Roan Cliffs blazing star (*Mentzelia rhizomata*), both of which are among Colorado's rarest plants.

Since 1987, Oxy has been making efforts to protect the rare plants on their property by entering into a land management agreement with CNAP that allowed for some monitoring and general rare plant protections. For 20 years, the energy company, the state program, and other partners (such as the Bureau of Land Management, Colorado Natural Heritage Program, and the U.S. Fish & Wildlife Service) watched over these plants and assured their continued survival. In 2008, with the climate for energy development heating up, Oxy began planning for limited natural gas development near the rare plant habitat. At this critical juncture, when development and rare species protection could have resulted in conflict, Oxy made voluntary efforts to approach CNAP and genuinely serve as a steward for a plant whose future was solely in their hands.

In July 2008, before any development was to occur near the rare plant habitat, Oxy and CNAP expanded their land management agreement to: (1) create state Natural Areas around the two largest rare plant habitats and (2) enact the most detailed Best Management Practices (BMPs) for rare plant protection that have ever been attached to a Natural Areas agreement. These BMPs included restrictive buffers around rare plant habitat, dust abatement measures, sediment and stormwater controls, noxious weed management, and extensive monitoring efforts. These measures will assure that development will not have any unintended consequences for rare plants in the area, and will still allow for limited natural gas drilling. As in most cases where rare plants occur, simple and low-cost actions can assure that sedentary species are not unintentionally harmed. By implementing such BMPs, Oxy has agreed not only to sit at the table of rare plant conservation, but to forge ahead as a leader in the oil and gas industry.

While the future of oil and gas development in Colorado may be wrought with threats to the natural values of our state, CNAP and Oxy USA have shown that it is possible to be stubborn stewards, while still working together toward a win-win solu-

tion. Although there are cases where development and species protection may *not* be compatible, it is important to recognize the potential for cooperative solutions. Hopefully, success stories such as this will become more common, and our rarest penstemons will survive the current petroleum boom.

Penstemon debilis. Copyright Andrea Wolfe.

Brian Kurzel is a Director on the Board for the Colorado Native Plant Society and works for the Colorado Natural Areas Program, where he monitors natural areas, evaluates sites, and coordinates conservation actions.

Alba-Lynn publishes Marr Fund Research

Chrissy Alba-Lynn, a 2005 recipient of a $500 grant from the John W. Marr Fund, recently published her master's thesis research, which was partially supported by this award from the Society. Chrissy's research examined whether, and to what degree, the interactions between black-tailed prairie dogs and western harvester ants altered vegetation structure and heterogeneity on the Colorado shortgrass prairie. Her paper, entitled "Interactive disturbance effects of two disparate ecosystem engineers in North American shortgrass steppe," was published in the August 2008 issue of *Oecologia.* Chrissy is currently a PhD student at Colorado State University studying the mechanisms of plant invasion.

Gardening in Reverse

by Diane Brown

For most people, gardening consists of plotting out beds of color and form with nursery stock as the source of plant material. When my husband and I bought a six-acre parcel along Middle Boulder Creek near Eldora in 1986, I thought we had found a small piece of paradise and I would never need to garden again. However, after several botanist/naturalist friends visited us and commented about the non-native plants that were present, I decided to try an experiment and turn our property into a native plant sanctuary by removing all non-native vegetation. Little did I know how much work that would entail, nor how rewarding the results would be.

When it comes to gardening with native plants, knowledge is everything. Before beginning to transform our property to a state of purely native vegetation, I needed to learn not only the local native plants, but also a host of introduced species. I was fortunate to have access to the plant lists done by Nan Lederer for the Eldora Environmental Protection Plan, as well as the list of plants she compiled for the Arapaho Ranch, which is adjacent to our property.

Six acres… it doesn't sound like much. But because I prefer to remove the non-natives only by hand and with no chemicals, mowers, goats, or other methods that might damage native plants, it has taken a lot of time and hard work to attempt to reach my goal.

In the beginning I focused on the area around our house and outbuildings. Our acreage is a south-facing hillside that gradually slopes down to the riparian zone along Middle Boulder Creek. In the late 1890s, a miner's log cabin and forge were built. We presume that during that time period, there would have been livestock on the property. The cabin was later enlarged and a septic system added, causing further disturbance around the house. In the 1950s, several donkeys were kept in an enclosure near the creek.

Most of the non-native plants in this area are introduced grasses, such as timothy, orchard grass, rescue grass, Kentucky bluegrass, and smooth brome. In the early years, because there were so many, my first priority was to be certain these grasses did not continue to go to seed. I clipped the seed heads off and dug as many clumps of grass up as possible, year after year. Now I am finding fewer and fewer of these grasses around the house and, in their absence, native plants are moving into these spaces. Louisiana sage, needlegrass, waterleaf, golden aster, showy aster, gaillardia, and others are flourishing.

For the most part I have not tried to control which native plants grow where. With help from the wind, pocket gophers, and other wildlife, seeds seem to germinate in the places best suited for them. I have collected seeds from native plants that I wished were on our property and strewn them about, hoping for success. This worked especially well with *Pulsatilla patens*, *Oxytropis lambertii*, *Gaillardia aristata,* and *Danthonia parryi*. In some cases

"**Gardening** " continues on page 12

"**Gardening**" continued from page 11

when I heard of an undisturbed site that was scheduled for construction damage, I appropriated natives as transplants. Some of those that did well for me were *Penstemon virens*, *Antennaria parvifolia*, and *Erythrocoma triflora*. When I transplanted *Iris missouriensis* from another garden in Eldora, I accidentally introduced the highly undesirable ox-eye daisy, which I quickly dispatched to the trash bin.

The Creek Meadow. East of our house, over a massive rock outcrop and down through Moonshine Gulch, is the creek meadow. As the moon rises, light strikes this gulch first, hence the name Moonshine Gulch. A local herbalist once came to look at the mariposa lilies in Moonshine Gulch. She said that the moon influences these lilies and, indeed, this is the primary location where they grow here. The early inhabitants of the miner's cabin used the creek meadow in two ways. They grew potatoes there, because it was moist and sunny. They also used it as a garbage dump, climbing up over the rock outcrop from the cabin and down into the meadow. For the past 22 years, I have picked out pieces of glass and metal from the earth there. Frost heave and pocket gophers churn the debris upward. Mostly, the glass is broken, but occasionally I find an intact bottle or a piece of a porcelain doll. The latest disturbance comes in the form of beavers cutting down aspen trees and dragging them to the creek. It will be interesting to see if, and how, this changes the composition of the meadow.

The disturbances in the creek meadow allowed non-native vegetation to get started. There may have been livestock there, but my theory is that native ungulates and rodents eat timothy and other introduced grasses and forbs, then leave the seeds in their droppings to germinate in new places. I have been removing timothy, rescue grass, salsify, dandelions, pennycress, and others over the years. Luckily, much of the meadow is dominated by native *Urtica gracilis* and *Hydrophyllum fendleri*. They seem to hold their own against the alien invasion. Stinging nettle is the host plant for the Milbert's tortoiseshell butterfly, therefore we encourage its presence.

After removing the alien plants, it is most rewarding to see how the natives react. Native plants that appeared not to be present at all, suddenly appeared and flourished! The earth, where timothy once dominated, is covered now with wild strawberry plants sending out runners everywhere. Under the aspens, a favorite place for timothy to invade, now grows the native grass *Elymus glaucus* along with *Helianthella quinquenervis*. Replacing the crowd of dandelions, salsify, and rescue grass are lovely and colorful native meadow plants, such as *Agoseris glauca*, *Erigeron speciosus*, *Rudbeckia hirta*, and *Penstemon virgatus*, complemented by wonderful native sedges. Were the seeds of these natives already long in the soil waiting for the opportunity to grow, or were they carried in from other sites by birds, mammals, and wind?

Pasqueflower (*Pulsatilla patens*). From Diane Brown.

The Bridge Meadow. The vegetative cover in the dry meadow at the entrance to our property is divided because of construction activity associated with the replacement of the county bridge that crosses Middle Boulder Creek. Approximately every 20 years, heavy machinery destroys half of the meadow. The last time the bridge was replaced was in 1990 and, at that time, the county reseeded the disturbed area with a witch's brew of non-native grasses and clover, then fertilized it with nitrogen and phosphorus.

In addition to bridge construction, the county provides road maintenance in the winter, spreading sand and gravel on the paved highway. This mixture comes from somewhere down on the plains and contains all manner of introduced weed species. The snow plow pushes gravel and snow onto the meadow edges and, from there, the weeds work their way further into the meadow. A few years ago the plow accidentally "planted" a plains cottonwood at the entrance to our driveway, the only one I know of in Eldora.

On the disturbed part of the meadow I spend a little time each day bagging dandelion heads and digging the plants out. I have used a weed whip in early spring to keep the alien grasses lower. Here and there, *Heterotheca villosa* and *Erigeron speciosa* are establishing themselves. I carefully pull and hand clip around them to encourage them to flourish. The colorful *Gaillardia aris-*

tata is making inroads as well.

The half of the meadow that was undisturbed is in relatively good shape with native plants, such as *Erigeron umbellatum*, *Geranium caespitosum*, *Drymocallis fissa*, *Campanula rotundifolia,* and many others. Here, I have successfully introduced *Pulsatilla patens* from seed collected at the Arapaho Ranch. I pull *Acetosella vulgaris* and *Bromopsis inerme* wherever I see them and carefully bag the seed heads.

The Sunny South-facing Hillsides. The steep south-facing slopes above our cabin are in good condition from a native plant perspective. They support many native grasses, such as *Festuca thurberi*, *Elymus elymoides*, *E. triticoides*, *Muhlenbergia montana*, *Koeleria macrantha*, and others. Native wildflowers delight the eye of the beholder from early April through October. Some that are abundant are *Boechera fendleri*, *Noccaea montana*, *Castilleja linariifolia*, *Atragalus flexuosus*, *Scutellaria brittonii*, *Senecio integerrimus*, *Penstemon virens*, *P. virgatus*, *P. glaber,* and *Ipomopsis aggregata*.

However, there are alien invaders even in such untrammeled habitat. These, if left to their own ways, will eventually have a negative impact on their native neighbors by crowding them out and robbing them of water and nutrients. The non-native weeds I actively remove are timothy, cheatgrass, salsify, musk thistle, mullein, yellow toadflax, and several species of introduced mustards. I carry a bag and a digging tool, and carefully remove seed heads from undesirable plants, uprooting and tossing the rest of the plant on the ground to recycle into the soil. Every year there are fewer weeds.

Timing is very important in weed removal. In early spring, it is still cool enough to work on the sunny slopes. The soil is moist and weeds come out with little resistance. I find the non-natives easily because of their habit of greening up long before the natives, in most cases. Spring is the best time for digging out musk thistle and mullein rosettes. Cheatgrass is best pulled when it is green; otherwise, when it turns brown, the seeds fall apart and scatter. I keep checking the slopes on a regular basis. During the monsoons of midsummer, there are usually some cool, rainy days that are advantageous to working on these sunny slopes. After the rains, it is good to check for newly germinated weeds.

Wild gardening has been a very enjoyable experience over the past 12 years. When I compare our property to those that have been allowed to be taken over by introduced plants, I am pleased with the results I see from my labors. It is a good feeling to know that I have helped native plants to flourish and that it has required virtually no additional water to be taken from Middle Boulder Creek for outside use. When we go on vacation, I don't worry about watering my garden. It takes care of itself. This is my Garden of Eden, a little piece of paradise saved, a place that stands relatively still in time.

Blanketflower (*Gaillardia aristata*). From Diane Brown.

Diane Brown summers with the Colorado Native Plant Society and winters with the Arizona Native Plant Society. She chairs the Eldora Civic Association's Noxious Weed Committee.

State Flower Images Wanted

The Dereila Nature Inn – www.dereilanatureinn.ca – is an online nature centre for lovers of nature. We feature all aspects of flora and fauna and are developing a page of state and provincial wildflowers. Your help would be greatly appreciated if you could donate any digital images to help complete the collection. Your photographs will be credited with your name, city and state. Images will be resized to 300 x 225 pixels. We thank you in advance for your consideration and help! Please e-mail us at diphoto@shaw.ca .
- Derrick Ditchburn

Announcements

Take a Native Plant Master Course

Is that wildflower useful for landscaping? Is it native or noxious? Learning which Colorado wild plants are suitable for landscaping and which are weeds are just two of the skills that participants acquire in the Native Plant Master™ Program, sponsored by Colorado State University Extension. The field-based courses focus on identification, ecology, and human uses of Colorado plants. Courses are held at local open space parks and other public and private lands in various counties across Colorado. Courses include use of a botanical key with an emphasis on scientific names and families.

Registration is limited. Applications are due for all county programs by 15 March 2009. Each course consists of three, four-hour sessions. There is a fee for each course, but the cost may be reduced for participants who agree to teach at least 20 people per year per course about Colorado plants. Participants who pass three courses and satisfy the teaching requirement become certified Native Plant Masters.

For more information, visit www.conativeplantmaster.org or contact the local Colorado State University Extension office in the following counties:

Boulder - (303) 678-6238
Custer - (719) 783-2514
Douglas – 720-733-6930
Eagle - (970) 328-8630
El Paso - (719) 636-8920
Jefferson - (303) 271-6620
Larimer - (970) 498-6000
Logan - (970) 522-3200
Mesa - (970) 244-1841
Morgan - (970) 542-3540
Montezuma - (970) 565-3123
Pueblo - (719) 583-6579
San Miguel - (970) 327-4393

For the latest information on more than 1,000 Colorado plants, browse the Colorado Plant Database website at http://coloradoplants.jeffco.us.

Mary Nielsen is Native Plant Assistant for the Native Plant Master Program with the CSU Extension office.

Rare Plant Monitoring Stewards Needed

How would you like to REV-UP monitoring for the rarest plants in Colorado? If so, you can become a… Rare Plant Monitoring Steward. Colorado Natural Areas Program, Denver Botanic Gardens, and other partners are ***'putting the petal to the metal'*** for monitoring of Colorado's rarest plants. This is a great opportunity to:

- **Receive training** in methods for rare plant surveys/monitoring.
- Be a leader of **rare plant monitoring/surveys** for priority species.
- **Contribute essential data** to inform management decisions.

The time commitment for the first year will be 2-3 days for training. In subsequent years, the commitment will be 4-6 total days per year. We ask that all volunteers who receive training sign a commitment to *four years of service.* You can get started by attending ***one*** of the following trainings in 2009:

22-23 May in the Piceance Basin, Rio Blanco County
12-13 June at the Denver Botanic Gardens

If interested, please contact Brian Kurzel at 303-548-8180 or brian.kurzel@state.co.us

RPM Stewards monitor threatened plants in Rio Blanco County. From CNAP.

Society News and Announcements

Board of Directors Election Results

Four Colorado Native Plant Society members were elected to the Board of Directors in the election that concluded 30 September. The membership voted to return incumbents Charles Turner and Steve Yarbrough and to seat two new Board members: Catherine Kleier and Bob Powell. The four will take their seats at the November Board meeting. Congratulations to the new members and thanks to all who submitted their names for the vote and to those who voted. Sixty individuals voted, 41 by email and 19 by regular mail.

The Board of Directors of CoNPS consists of voting and non-voting members. Voting members are the seven presidents of the chapters, the ten at-large members (elected each year on a staggered schedule of three, three, and four) and the president, vice-president, treasurer, and secretary elected by the Board from the entire Society. Committee chairs and the administrative assistant are non-voting members of the Board.

Meeting dates and minutes of Board Meetings are posted on the CoNPS web site. Meetings are open to all members.

Website News

The Botanical News page is updated daily with information about botanical jobs, conferences, research results, new botanical publications, etc. Each chapter has a web page at www.conps.org with its field trips and programs announced.

"Botanical Slide Shows" is a popular section of the website with photo shows on the Orchids, *Botrychium*, *Physaria,* and various plant communities around the state.

You will also find plant lists from many field trips held over the years. Please contact web master Al Schneider at 970-882-4647 or webmaster@conps.org with comments and suggestions.

2008 Annual Meeting Notes

The 2008 CoNPS Annual Meeting drew 85 attendees; you can see photographs of some of the highlights of the Meeting on the CoNPS web site. Certainly a high point of the Meeting was the presentation by Utah flora expert Stanley Welsh, who was gracious enough to share his 80th birthday with us.

2009 Annual Meeting Notes

The Northern Chapter will be hosting the 2009 Annual Meeting on September 11-13 at The Ranch near Fort Collins. The Rare Plant Symposium will take place on Friday, September 11th, during the day.

We are looking for volunteers to coordinate a silent auction, native plant sales, or participate on a committee to obtain speakers and field trip leaders. As the event nears, we will also be interested in helpers at the meeting site. We are still refining this year's theme. Keep watching the website for more details!

If you are interested in helping out with the 2009 Annual Meeting, please contact Pam Smith at 970-223-3453 or pamelas4824@earthink.net.

Polytrichum commune
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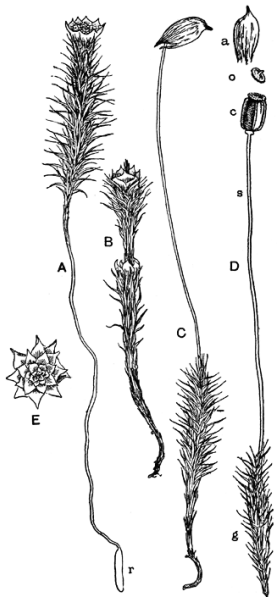


Aquilegia Deadline Approaches
Submit Contributions by 15 January

Announcements, news, articles, book reviews, poems, and other contributions are requested for publication in Aquilegia. Articles not exceeding 750-1500 words in length are especially welcome. Include author's name, address, and affiliation, as well as credit for images. Please follow closely the format from previous issues. Previously published articles submitted for reprinting require permission. All contributions are subject to editing for brevity and consistency. Submit via email to Leo.Bruederle@ucdenver.edu.

Chapter News and Announcements

Boulder Chapter

Boulder Chapter meetings are typically held on the second Thursday of each month (October through May) at 7:00 PM. All meetings will occur in the Community Room at the Boulder REI Store at 1789 28th Street, between Canyon and Pearl. For more information, visit www.conps.org or contact Cathern Smith at smith_cathern@yahoo.com or 202-841-4016. Help make 2008 zero waste — bring your own cup and plate.

11 December 2008 **Thursday at 7:00 PM**

Boulder REI Community Room

Survey of Critical Biological Resources in Boulder County

Stephanie L. Neid (Ecologist, Colorado Natural Heritage Program) will discuss survey results and trends in biodiversity status from CNHP's comprehensive survey of rare, threatened, and endangered species and habitats in Boulder County. Until this survey was completed, Boulder County had a long history of biodiversity conservation and protection, but no comprehensive source for biodiversity information.

8 January 2009 **Thursday at 7:00 PM**

Boulder REI Community Room

Eldorado Fire at Walker Ranch - Vegetation Reestablishment Monitoring

Patrick Murphy, a botanist/plant ecologist, will discuss a study that quantitatively monitored vegetation recovery after fire at 18 locations that were recorded with GPS, marked with survey caps, and photographed to allow long-term analysis. The purposes of the study were to provide data that would quantitatively describe post-fire and post-treatment conditions, and monitor change over time.

12 February 2009 **Thursday at 7:00 PM**

Boulder REI Community Room

Grasslands on Ancient Soils in Boulder County: Does Plant Community Age Show?

David Buckner (ESCO Associates) will talk about plant communities occupying surfaces of six age steps between 5000 and approximately 2 million years old. The oldest plant communities have been "through" 20 glacial-interglacial cycles during the past 2 million years. The importance of conserving them for research, as well as out of respect for their sheer tenacity, will be discussed.

12 March 2009 **Thursday at 7:00 PM**

Boulder REI Community Room

Botanical Illustrator, Ida Hrubesky Pemberton

Carolyn Crawford of Louisville, a botanical artist for the last 27 years, will show digital slides and discuss Denver artist Ida Hrubesky Pemberton's majestic botanical artworks of medicinal plants. Originally made with the hope that they would be published in a book on Drug Plants, most of the original artwork now resides at the CU Museum of Natural History.

9 April 2009 **Thursday at 7:00 PM**

Boulder REI Community Room

The Chatterbox Orchid Reveals it's Secrets

Denise Wilson (M.S. Candidate, University of Colorado Denver) will discuss her pollination biology research conducted on the chatterbox orchid, *Epipactis gigantea,* at three sites near Grand Junction, Carbondale, and Salida. These are beautiful and unique ecosystems of cold seeps and hot springs, which are home to blue-eyed grass, fireflies, long-eared bats, and Brazilian free-tailed bats.

Metro-Denver Chapter

Monthly meetings of the Metro-Denver Chapter are typically held on the fourth Tuesday of the month (September through May, except November). Through December, meetings will be in the Waring House, south of the main entrance to the Denver Botanic Garden. Beginning January 2009, meetings will be hosted by the Department of Biological Sciences at the University of Denver, where we will meet in Olin Hall located at 2190 E. Iliff Ave. (http://www.du.edu/maps/index.html?mpType=0&mrkID=8). For more information, visit www.conps.org or contact Vickey Trammell at jrtrambo@q.com or 303-795-5843.

9 December 2008 **Tuesday at 7:00 PM**

Waring House at Denver Botanic Gardens'

Sound Advice for Prairie Plants

Mary Bonnell (Senior Resource Specialist, Aurora Parks and Open Space) has been talking to plants again! Let's face it — it's hard to be a prairie plant. These tough residents of prairie ecosystems must overcome the many challenges of their habitat. For 19 years, Mary has been combining art, science, and enthusiasm to encourage people of all ages to discover and enjoy the natural world.

27 January 2009 **Tuesday at 7:00 PM**

Olin Hall at DU, Room TBA

Conservation Triage: How do we decide which species to save?

Anna A Sher, Ph.D. (Associate Professor, Biological Sciences, University of Denver; Director of Research and Conservation, Denver Botanic Gardens) will speak on the efforts to preserve at risk species and how targeted species are chosen.

24 February 2009 **Tuesday at 7:00 PM**

Olin Hall at DU, Room TBA

Creating Native Plant Habitats

Susan Smith (Education Coordinator, Habitats Program, National Wildlife Federation) will speak on creating natural habitats and introduce us to the Backyard Habitats and Schoolyard Habitats certifications.

24 March 2009 **Tuesday at 7:00 PM**

Olin Hall at DU, Room TBA

Sensitivity of Grasslands throughout the Great Plains to Future Variability in Rainfall

Dr. Jana Heisler White (Research Scientist, Department of Renewable Resources, University of Wyoming) received her PhD in ecology from CSU. She is currently studying the effects of elevated carbon dioxide and warming on rangeland ecosystems.

28 April 2009 **Tuesday at 7:00 PM**

Olin Hall at DU, Room TBA

The Chatterbox Orchid Reveals its Secrets

Denise Wilson (M.S. Candidate, University of Colorado Denver) will discuss her pollination biology research conducted on the chatterbox orchid, *Epipactis gigantea,* at three sites near Grand Junction, Carbondale, and Salida. These are beautiful and unique ecosystems of cold seeps and hot springs, which are home to blue-eyed grass, fireflies, long-eared bats, and Brazilian free-tailed bats.

26 May 2009

Second Annual Denver Chapter Spring Hike

Chapter members, who will have an opportunity to suggest and select the destination for the spring hike, will choose the time and place of the hike. At the end of May, the open spaces around Denver are bright with wild flowers. It's time to get out on the trail with your fellow wild flower experts and find as many as we can.

San Luis Valley Chapter

Chapter activities are scheduled throughout the year. For more information, visit www.conps.org or contact Chapter President Hobey Dixon at 719-589-3813 or pixies@amigo.net

Plateau Chapter

Chapter activities are scheduled throughout the year. For more information, visit www.conps.org or contact Chapter President Jeanne Wenger at 970-256-9227 or stweandjaw@acsol.net. The Chapter is recruiting for the office of President.

Northern Colorado Chapter

Chapter meetings are held on the first Wednesday of the month (October through April) at 7:00 PM. Meet at the Gardens on Spring Creek, 2145 Centre Ave., Fort Collins. Prior to meetings, members meet at 5:30 PM for dinner with the speaker at Café Vino, 1200 S. College Ave. If you would like to join us for dinner, please contact Chapter President Pam Smith at 970 223-3453 or pamelas4824@earthlink.net. For more information, visit www.conps.org.

4 February 2009 **Wednesday at 7:00 PM**

Gardens on Spring Creek

Fire history, forest structure, and tree ring chronology in Larimer County, CO

Laurie Huckaby (USFS Rocky Mountain Research Station) will present a program on her research in Larimer County.

Southeast Chapter

Activities for the Southeast Chapter are scheduled throughout the year and are often held in Colorado Springs at the Beidleman Environmental Center on Caramillo Street, north of Uintah, off Chestnut. For more information, visit www.conps.org or contact Liz Klein at 719-635-5927 or elizaklein@gmail.com, Elsie Pope at 719-596-4901, or Doris Drisgill at 719-578-1091 or 719-322-3902. The Chapter is recruiting for the office of President.

Southwest Chapter

The Southwest Chapter explores, preserves, and enjoys the flora of the Four Corners area through activities that are scheduled throughout the year. We welcome new ideas for field trips, activities, and programs, and we especially welcome new members from Colorado, New Mexico, Arizona, and Utah. For more information, visit www.conps.org or contact Chapter President Al Schneider at 970-882-4647 or webmaster@conps.org. The Chapter has concluded its season of field trips, but members are looking forward to potluck-socials in November, January, and March. See www.conps.org/southwest.html for details.

"**Chapter News**" continues on page 18

"**Chapter News**" continued from page 17

22 November 2008 Saturday from Noon until 4:00 PM
Durango Recreation Center
Potluck-social, Native American flute music, and photo show
After lunch we will discuss winter activities in which the Chapter can be involved, especially raising money to support local students doing botanical research. Following this, Norman Lopez of the Ute Mountain Ute Indian Tribe will play music on flutes made of native trees and tell us about the place of native plants in Ute ceremonies. Bob Powell, just elected to the CoNPS Board of Directors, will conclude the afternoon with a photo show on the plants of the temperate and cold vegetation zones of Ecuador. Call Al Schneider at 970-882-4647, if you would like to attend.

At the January meeting we will have a potluck social, plan our field trips for the 2009 season, and conclude with a photo show presented by Eve Gilmore.

Aquilegia

Newsletter of the Colorado Native Plant Society

Aquilegia is published four or more 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.

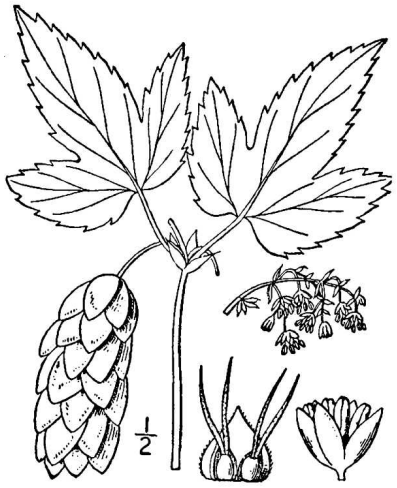
Articles from 750 to 1500 words in length are welcome. Previously published articles submitted for reprinting require permission. Digital photographs or line drawings are also solicited. Please include author's name, address, and affiliation. Articles must be submitted electronically as email attachments. Articles and other contributions may be edited.

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

Please direct all contributions to the newsletter to:
Leo P. Bruederle, Editor
leo.bruederle@cudenver.edu
University of Colorado Denver
Pease direct all questions or comments regarding layout, printing and distribution to:
Kim Regier
kimberly.regier@cudenver.edu
University of Colorado Denver

Welcome New Members

Arren Allegretti
Karen Archey
Larry Ballenger
Rebecca Bice-Loegering
Sara Born
Keri Bowling
Steve Boyle
Shawn Conner
Lylamae Chedsey & Michael Crumly
Sara Darling
Michelle Deprenger-Levin
Elizabeth Drozda-Freeman
Greg Everett
James Ferguson of Turfmaster Sod Farm
Elin Franzen
Alana Gay
Peter Gordon
Suzanne Granger
Julia Hanson
Carrie Harrod
Barbara Hawke
Julie Holland
Katy Howe
Marye Jackson
Judy King
Nancy Kranzow
Dennis Krizek
Nanette Kuich
Jim Le Fevre
Ron MacDonald
Dieter & Deborah Martin
Dr. Ross McCauley
Karin McShea
Maggie Pedersen
Deborah Pero
Arthur Phillips
Rob Pudim
Jorden Ridnour & Family
Joshua Ryan
Charlie Sharp
Wendy Shinn
Matthew Smith
Crystal Strouse
Kallin Tea
Chloe Tewksbury
Ron Van Ommeren
Carla Vick
Michael & Lisa Wade
Nancy Wallace
Charlene Weidner
Whitney Wimer
Peggy Woodis
Terry Wright



Humulus lupulus
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 1: 633.

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.

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MEMBERSHIP APPLICATION AND RENEWAL FORM

Name(s) _____

Address _____

City _____ State _____ Zip _____

Phone _____ E-mail _____

Chapter: _____ Boulder _____ Metro-Denver _____ Northern _____ Plateau
_____ San Luis Valley _____ Southeast _____ Southwest

DONATION

$_____ General Fund

Endowments in support of small grants-in-aid of research:

$_____ John Marr Fund: research on the biology and natural history of Colorado native plants.

$_____ Myrna P. Steinkamp Memorial Fund: research and other activities that will benefit the rare plants of Colorado.

MEMBERSHIP CLASS

Dues cover a 12-month period

___ Individual, $20.00
___ Family/dual, $30.00
___ Senior, $12.00
___ Student, $12.00
___ Organization, $30.00
___ Supporting, $50.00
___ Lifetime, $300.00

Mail to: Eric Lane, PO Box 200, Ft. Collins, CO 80522 DUES AND CONTRIBUTIONS ARE TAX-DEDUCTIBLE

CALENDAR 2008

CHAPTER PROGRAMS

Boulder Chapter

Dec. 11	Bio Resources Boulder Cty
Jan. 8	Eldorado Fire
Feb. 12	Grasslands Boulder Cty
March 12	Botanical Ilustrator
April 9	Chatterbox Orchid

Metro-Denver Chapter

Dec. 9	Mary Anne Bonnell
Jan. 27	Conservation Triage
Feb. 24	Creating Native Plant Habitat
March 24	Grasslands
April 28	Chatterbox Orchid
May 26	Spring Hike

Northern Colorado Chapter

Feb. 4	Larimer County

Southwest Colorado Chapter

Nov. 22	Potluck

TIME SENSITIVE MATERIAL

SOCIETY WORKSHOPS

Jan. 23 & 24	Wetlands
Feb. 7 & 8	Astragalus
March 14 & 15	Mosses, Ferns, Horsetails
April 25 & 26	Interesting Grass Genera
May 2 &3	Basic Wildflower ID

BOARD MEETINGS

Nov. 15	9:00 AM	TBA

See http://www.conps.org/conps.html for details.

Colorado Native Plant Society
P.O. Box 200
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http://www.conps.org