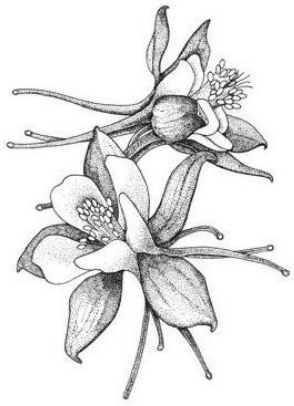
Aquilegia

Newsletter of the Colorado Native Plant Society



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

2008/2009 WORKSHOPS

by Ann Henson

Colorado Native Plant Society workshops are designed for plant enthusiasts of all levels, from novice to expert. During these sessions there is usually plenty of time for learning and fun!

REGISTRATION INFORMATION

Workshops are for Society members only. Nonmembers must join CONPS in order to be able to register for a workshop. Nonmembers may use the registration form (enclosed) to join.

Registration is mail-in only and requires payment at the time of registration. For each workshop, choose either session one or two, as they are typically more-or-less the same. The registration fee for each is $20. **This fee is non-refundable.** Furthermore, schedule changes cannot be accommodated because of time and space limitations.

Participation is often limited and registration is processed in the order received. If the workshop has already been filled, you will be notified, your check will not be deposited, and you will be added to the waiting list, if that is your desire.

To register, please mail your check payable to CONPS for $20 per workshop along with the registration order form provided in this newsletter and on our website. Or send your check with the following information: title and date of the workshop(s) you would like to attend, your name, address, telephone number, and email address. Registration can only be processed with all of this information.

Mail to: CONPS c/o Linda Smith
6822 Mission Rd,
Colorado Springs, CO 80915

Registrations will not be accepted until after September 15, 2008. For those who need to cancel at the last minute, please contact Linda Smith at 719-574-6250 or conpsoffice@aol.com so she has the opportunity to fill your spot.

WORKSHOP HOSTS NEEDED

Arriving at a CONPS workshop means that a friendly face will greet you. This wonderful person has opened the building, brought the microscopes, made sure a name tag is available, plugged in the tea pot, and provided some treat to feast upon. Our host will make sure that materials are secure for the night and repeats this for the second session. Could you be a host? If you are willing to be a host at a workshop you will attend or just over a weekend contact Ann Henson at 303-772-8962.

"**Workshops**" continues on page 2

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"**Workshops**" continued from page 1

DON'T KNOW MUCH ABOUT… GRASSES

Leaders: Lynn Riedel and Ann Henson
Location: CSU Extension Service, Community Room
Natural Resources Building
9595 Nelson Rd.
Longmont, CO
Time: 9:00 AM to 3:00 PM
Session One: Saturday, 4 October 2008
Session Two: Sunday, 5 October 2008

Afraid of grass identification? Know it's too hard?! In this beginner's workshop, participants will gain a working knowledge of the terminology used in grass identification. Using *Illustrated Keys to the Grasses of Colorado* by Janet Wingate, along with dried grasses, photographs, and herbarium specimens, we will get you comfortable.

Visit CONPS on-line bookstore where you can buy *Illustrated Keys to the Grasses of Colorado* by Janet Wingate. Look under the pink box for members' only books. Books will also be available at the workshop.

COLORADO ETHNOBOTANY WITH AN EMPHASIS ON GREAT PLAINS AND HISPANIC PLANT LORE

Leader: Donald Hazlett
Location: CSU Extension Service, Community Room
Natural Resources Building
9595 Nelson Rd.
Longmont, CO
Time: 9:00 AM to 3:00 PM
Session One: Saturday, 1 November 2008
Session Two: Sunday, 2 November 2008

Botanists often focus on rare plants, while ethnobotanists focus more on the common plants. This makes sense since, when Native Americans or early settlers became ill, a readily available or common plant would be a much better choice for a medicine than a rare one that grows only in a distant canyon. Indeed, many of the eastern Colorado plants are widespread, which makes them more available as medicines when needed.

This ethnobotany workshop will focus on the folklore, common names, Nahuatl (Aztec) names, and uses for native Colorado plants, especially those on the eastern plains and those sold in Hispanic *boticas* (drug stores). Some native plant uses have been well documented as effective medicines, while others have yet to be widely recognized as useful. In this workshop, we will look both at herbarium specimens and at herbals that have been packaged for sale to the public.

COLORADO WILLOW IDENTIFICATION

Leader: Gwen Kittel
Location: CSU Extension Service, Community Room
Natural Resources Building
9595 Nelson Rd.
Longmont, CO
Time: 9:00 AM to 3:00 PM
Session One: Saturday, 15 November 2008
Session Two: Sunday, 16 November 2008.

Gwen Kittel, Regional Vegetation Ecologist with NatureServe, will present a workshop on willows, with a focus on summer and winter identification and ecology. Willow identification can be greatly aided by understanding species distribution and ecology, including which species occur where and with what other species. We will learn: a) terms specific to the Salicaceae or willow family, b) to tell young cottonwoods from willows, c) to identify willows with floral parts, d) to identify willows by only vegetative characteristics, and e) to differentiate the 12 most common willows. Gwen has worked with willows for many years and can identify all 25 willows in Colorado based on vegetative characteristics alone. A dichotomous key based on vegetative characters of Colorado Willows will be distributed at the workshop.

WETLAND COMMUNITIES AND THEIR COMMON SPEICES

Leader: Barry Johnston
Location: Longmont, CO (location to be determined)
Time: 9:00 AM to 3:00 PM
Session One: **Friday**, 23 January 2009
Session Two: Saturday, 24 January 2009

Various "wetlands" exist in Colorado. Getting your feet wet is not required to become familiar with the most common types in this workshop. What are they, where do they occur, and what species are common members of each community will be explored. How wetlands are classified or defined will be explained. Tour examples of these interesting plant communities via photographs and specimens.



Salix discolor
Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database / USDA SCS. 1989. Midwest wetland flora: Field office illustrated guide to plant species. Midwest National Technical Center, Lincoln.

ASTOUNDING *ASTRAGALUS* IN COLORAD

Leader: Jennifer Ackerfield
Location: Colorado State University
E-005, Plant Sciences Building
Fort Collins, CO
Time: 9:00 AM to 3:00 PM
Session One: Saturday, 7 February 2009
Session Two: Sunday, 8 February 2009

Explore *Astragalus*, as a group, with CSU Herbarium specimens and guidance from Jennifer Ackerfield, Collections Manager. Gain knowledge of characteristics, such as flowers and pods, using keys for this amazing group of plants.

HELP! THERE'S A GAMETOPHYTE IN MY ENGLISH IVY! THE STRANGE LIFE OF MOSSES, FERNS, AND HORSETAILS

Leader: Vickey Trammell
Location: Arapahoe Community College Biology Lab
Optional: Denver Botanical Gardens
Time: 9:00 AM to 1:00 PM
Optional: DBG Tropical Observatory
Sessions: Late February or early March

Contact Ann Henson at 2henson@kwabena.us or 303-772-8962 for details after 1 October 2008. Attendance limited to 24 per session.

Do your ferns have brown spots on the backs of their leaves? Have you ever wondered what that brown thing is on top of moss? If someone asks you to join them gathering Smooth Scouring Rush seeds, should you go? If you don't know the answers to these questions, then you might enjoy a beginner's experience with the life cycles, biology, and ecology of lower plants. Subjects covered will include: results of cell division by mitosis and meiosis, alternation of generation between gametophyte and sporophyte generations, habitat and adaptations of lower plants, their place in the ecosystem and in evolution of the plant kingdom, and where to find one for a pet! We will learn important terminology and anatomical details. Although we will not identify the specimens to species, you will be ready to take the next step.

Each attendee will get to use a compound microscope and dissecting scope. We will have live green plants to work with. Bring a sack lunch. Those who still want more experience can go with Vickey to the Denver Botanic Gardens tropical conservatory and search for everything we saw in lab! Be advised that you will need to pay an entrance fee at the gate, if you aren't a member of DBG.

"INTERESTING" GRASS GENERA

Leader: Robert Shaw
Location: Fort Collins, CO (location to be determined)
Time: 9:00 AM to 3:00 PM
Session One: Saturday, 25 April 2009
Session Two: Sunday, 26 April 26 2009

There are several interesting grass genera that members find difficult to identify. Dr. Robert Shaw (author of *Colorado Grasses)* will help us with *Festuca, Elymus and Muhlenbergia*. He will identify and teach other "interesting" species using unknowns from participants. What a wonderful opportunity to get expert help in your identification questions! Also, get updated on new ideas in grass taxonomy.

This workshop is geared to those individuals with intermediate to advanced level of grass identification skills. Copies of *Colorado Grasses* will be available for purchase.

BASIC WILDFLOWER IDENTIFICATION

Leader: Mary Ann Bonnell
Location: Morrison Nature Center at Star K Ranch
16002 E Smith Rd.
Aurora, CO
Time: 9:00 AM to 3:00 PM
Session One: Saturday, 2 May 2009
Session Two: Sunday, 3 May 2009

Jumpstart your 2009 wildflower season with a primer on plant parts, family characteristics, and the use of a botanical key. In addition to covering the basics, we'll help you overcome your fear of composites and the pea key. This class will be indoors. Bring a sack lunch and a hand lens. Attendance is limited to 15 per session.

Ann Henson is Chair of the Workshop Committee and Society Secretary.

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.

Willow (*Salix* spp.) Clipping in Breckenridge, CO for Cross-country Ski Trails

by Catherine Kleier, Christy Carello, and Audrey Hoffa

Introduction

Willows (*Salix* spp.) are dominant shrubs in western ecosystems, particularly riparian areas, and Colorado has 29 species within genus *Salix* (Dorn & Dorn, 1997). Since the disappearance of wolves from Colorado, willows have shown a decline in growth and fitness due to heavier grazing from elk and deer (Hebblewhite et al, 1995). If willows are being grazed more heavily, then understanding their response to grazing is an important management question. Additionally, willows are a primary food source for beaver (*Castor fiber*); thus, when there is a willow decline, beaver populations also fall (Nolet, 2005). Beavers keep water tables high, so a lack of beavers could present willow with water stress. Alternatively, herbivory decreases leaf area, which in turn reduces transpirational water loss and increases shoot water potential (Johnston et al., 2007).

Willows also occur in areas of high recreational traffic. Cucumber Gulch is a wildlife preserve located between the town of Breckenridge and the Breckenridge Ski Resort in Colorado. The wetlands within this preserve represent an endangered habitat and have been designated an ARNI (Aquatic Resource of National Importance) by the Environmental Protection Agency. Because of its ecological significance, the Town of Breckenridge has consistently supported conservation monitoring of the preserve. However, these conservation activities are balanced by recreation, and the willow community surrounding the wetland has been altered for winter-time cross-country ski paths. Willows within the path of certain cross-country ski trails have been trimmed after substantial snow fall to maintain trails that are free of shrub tips emerging from the snow.

In this study, the management activity of clipping willow presented an opportunity to investigate the role of selective clipping on the growth, reproduction, and water status of willow. Clipping of willow in this experiment serves as a proxy for elk grazing and provides an opportunity to determine willow responses in growth and fitness to grazing. We hypothesized that willow would show a decrease in growth rate due to clipping and that the clipping would reduce above-ground biomass; thus, transpiration would be decreased and shoot water potential would be greater. To test these hypotheses, we measured growth, number of catkins, and water potential in clipped and unclipped quadrats. Understanding the effects of such clipping are important in a management context and also to further our understanding of willow ecology in general.

Materials and Methods

Cucumber Gulch is a preserve of 77 acres, and it contains several vegetation types; however, our work took place in the shrub-wetland habitat. These habitats are dominated by willows (*Salix* spp.). The altitude is approximately 10,000 feet and our sites were located between 39° 29' 496.099" N and 106° 03' 889.595" W.

In May 2006, we designated ten 1 m^2 quadrats in two drainages in and near Cucumber Gulch. The test drainage had been mowed every November for seven years to clear willow and enable cross-country ski trails through the open willow area; thus, this treatment is called "clipped." The control drainage had never been mowed, and it was called "unclipped." The quadrats were located roughly ten meters apart through each of the drainages. Although a random placement may be more statistically robust, this was not possible, due to the five meter wide path that was mowed through the clipped site. In order to remain consistent, our test plots had to be within this mowed area, and so we chose to place our unclipped plots along a transect, as well.

Within each quadrat, we placed ¼ inch diameter aluminum tags on all willow plants. Because we could not determine ramets from genets, we did our best to tag all plants that were potentially separate individuals. Tags were placed in the node of a branch, to ensure that branch length would be consistently measured each month. We tagged 76 plants in the ten unclipped plots and 99 plants in the ten clipped plots. Density in the plots varied from three to 14 stems per square meter.

At the end of May, June, July, and August we sampled all plots in both clipped and unclipped sites. We measured overall plant height as distance from the ground to the tallest tip, and branch length as the distance from the node where we placed the aluminum tag to the tip of the branch. We also counted any catkins that we found on the plant. Each time we sampled the plots, we measured water potential of one individual from each plot at each site. All water potential measurements were made between 10:00 AM and 12:00 PM on sunny to partly-sunny days. We clipped one branch from each plot and then measured it using a Scholander-type pressure chamber.

Results

Through all months, there were clear differences between the clipped and unclipped plots in terms of overall growth. Unclipped plots had taller plants May through August, and these plants also showed longer branch lengths; however, the plants in the clipped plots started smaller, thus we measured growth rate from one month to the next.

We measured three growth intervals: May to June, June to July, and July to August. For plant height, there was no difference in growth from the May to June interval, but unclipped plants had a much higher growth rate for the June to July and July to August intervals (Figure 1). For branch length, the unclipped plants showed a higher growth rate for the May to June and June to July interval, but the clipped plants showed less of a negative growth rate for the July to August interval than did the unclipped plants (Figure 2). For both plant height and branch length, the greatest difference in growth was seen in the greater growth rate of the unclipped plants for the June to July interval.

Reproduction and water potential showed some differences between sites as well. Catkin number was always greater in the unclipped plants than in the clipped plants, and the highest catkin numbers for both groups were seen in May (Figure 3). Shoot water potential was higher (less negative) in the clipped plots in May and August, though in June unclipped plots showed higher (less negative) shoot water potentials than clipped (Figure 4). There was no difference between clipped and unclipped plots in July.

Later in the summer, we observed that we had tagged two different species: *Salix geyeriana* and *Salix planifolia*. These species were indistinguishable to us when we placed the tags, and it may be possible

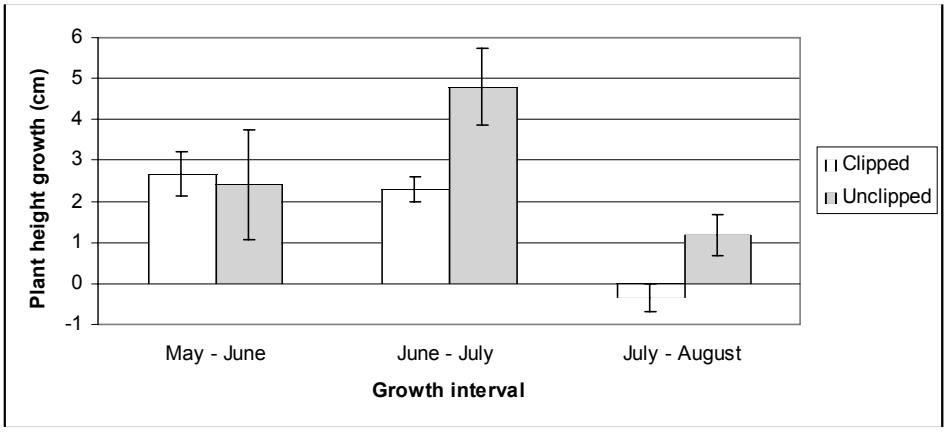


Figure 1. Difference in growth rate of overall plant height during three intervals of the 2006 growing season between clipped and unclipped willow shrubs (*Salix* spp.), where N = 76 for unclipped and 99 for clipped. Bars show standard error of the mean.

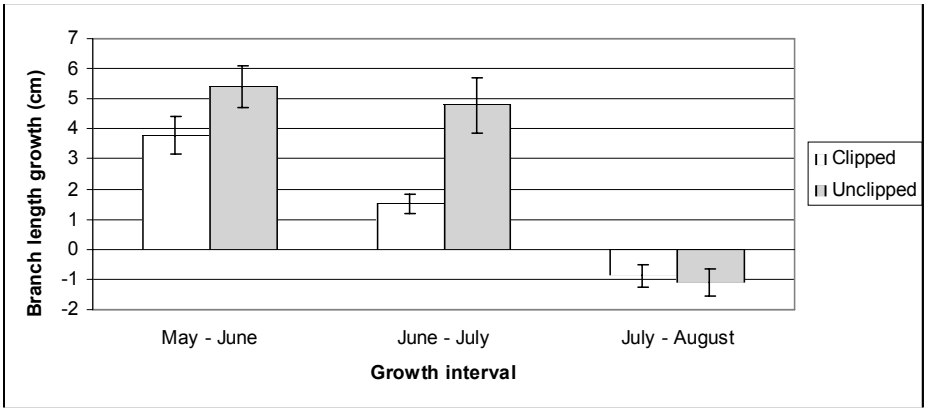


Figure 2. Difference in growth rate of overall branch length during three intervals of the 2006 growing season between clipped and unclipped willow shrubs (*Salix* spp.), where N = 76 for unclipped and 99 for clipped. Bars show standard error of the mean

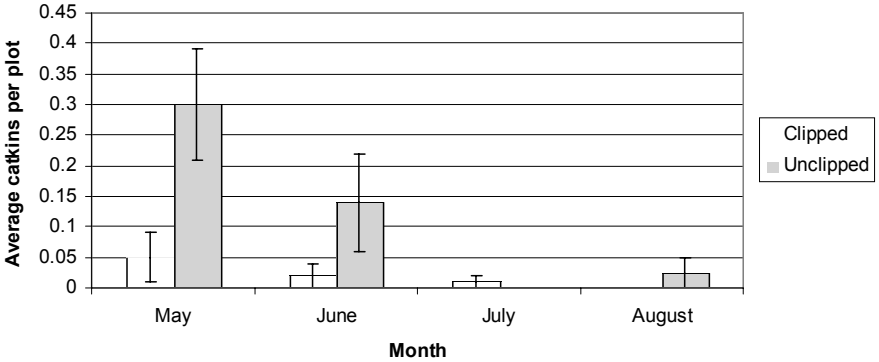


Figure 3. Mean number of catkins found on willow shrubs (*Salix* spp.) throughout the 2006 growing season between clipped and unclipped treatments, where N = 76 for unclipped and 99 for clipped. Bars show standard error of the mean.

"**Willows**" continues on page 8

"**Willows**" continued from page 7

that they hybridize. In August, we were able to distinguish the species, and retroactively investigated differences in growth. In the unclipped control plot, there were 42 *S. geyeriana*, 29 *S. planifolia*, and four that were marked as potential hybrids. For the clipped treatment plot, there were 26 *S. geyeriana*, 67 *S. planifolia*, and four again, that were potentially labeled as hybrids. Because there were differences in species numbers between the two sites, it was imperative to determine if growth rates were different. Within the unclipped site, there was no difference in either total plant height or branch length. Within the clipped site, there was no difference in plant height, but branch length did differ, with *S. planifolia* having a mean branch length of 15.87 inches and *S. geyeriana* having a mean branch length of 21.12 inches. To determine if the difference was due to a random difference in branches that were selected or to real differences in growth, we compared the amount of growth from July to August between the different species at the clipped site. Between July and August, *S. geyeriana* had a mean growth of -0.019 inches and *S. planifolia* showed a mean growth of -0.92inches. A two-tailed t-test for unequal variance reported a p-value of 0.14, indicating that there was no difference in growth between the two species.

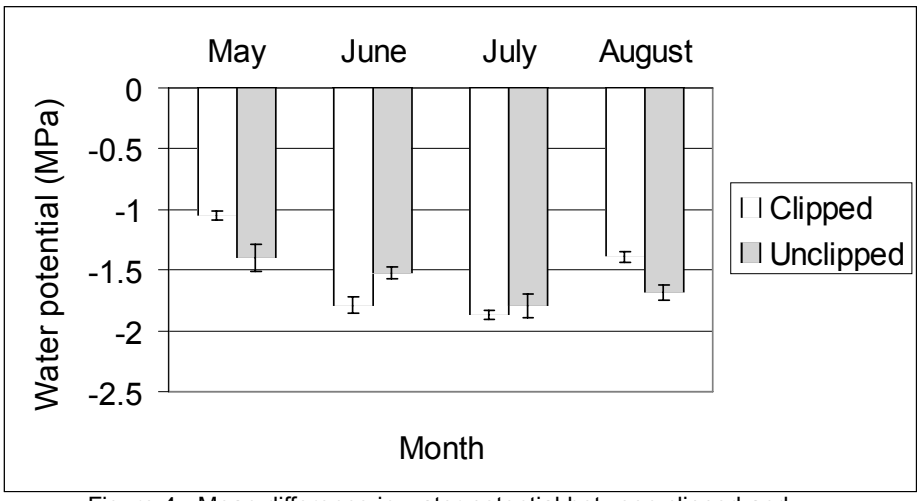


Figure 4. Mean difference in water potential between clipped and unclipped willow shrubs (N = 10) throughout the 2006 growing season. Bars show standard error of the mean.

Discussion

The compensatory growth hypothesis was not supported by these data with willow in a subalpine wet meadow. The compensatory growth hypothesis would suggest that the clipped shrubs would compensate for being clipped and thus show a greater rate of growth or fitness, but this was not the case. On the contrary, the unclipped shrubs showed greater growth during the peak growing season (June to July) than did the clipped shrubs. The compensatory growth hypothesis may not be acting here because willows are perennial plants, and because the grazing pressure on this area is less than the prairies ,where the compensatory growth hypothesis was first determined (Crawley, 1997). Additionally, the subalpine climate may be too severe to support compensatory growth in that the growing season may be too short to enable plants to catch up.

Reproductive output also failed to show any sort of compensatory response. Clipped plants showed lower fitness than unclipped plants. At the height of the reproductive season (May), the unclipped plants showed nearly six times the number of catkins as the clipped plants. In June, when unclipped plants had lost over half of their catkins, the average numbers were still well above the average high for the clipped plants. This is significant because it shows the clipped plants have a much harder time reproducing than the unclipped plants.

Water relations were less clear between clipped and unclipped willow. Early in the growing season, we observed standing water in many of the plots, so it's surprising that there was any difference between the two treatments. However, in both May and August, clipped plants showed a higher (less negative) shoot water potential. This trend was reduced in June, when shoot water potentials were lower (more negative) for clipped plants. This result may be due to warmer ground temperatures during this month before leaves had fully emerged in the clipped plants, though this was not tested.

Although these results are interesting and point to possible diminishing willow numbers in Cucumber Gulch over time, there were some errors with this pilot project that should be highlighted before management decisions are made. First, we were unable to completely identify willow shrubs to species early in the growing season; therefore, there are two species in this study. There could be interspecies differences in physiology that would interfere with our overall findings. Second, the control plots for this study were located in a different drainage, and conditions there could have attributed to the differences found between treatments. Last, due to the nature of the experimental plots all being located within a swath of clipped willow, there is a certain degree of pseudoreplication in the design that could not be avoid-

ed, but should be pointed out nevertheless. In a previous study, areas with willow showed greater diversity than those without willow, and diversity was greater in areas of unclipped versus clipped stands (Kleier et al., 2006). Because willow is such an important part of this community and because the present study certainly shows that there are potential effects from clipping willow for cross-country ski trails, further monitoring is planned.

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2008 CONPS Grant Recipients

Steinkamp Awards

Dr. Lara Kueppers and Dr. Ramona Butz. University of California, Merced. Global Observation Research Initiative in Alpine Environments (GLORIA) at the Rocky Mountain Biological Laboratory (RMBL) $1,000

Krissa A. Skogen (Doctoral student). University of Connecticut. Primroses, pollinators and practicality: Identifying land use priorities by the effect of habitat fragmentation on pollinator declines and plant reproduction. $800

Marr Awards

Denise Wilson (MIS student). University of Colorado, Denver. *Epipactis gigantea* - Pollination Syndromes at three Colorado elevations. $600

Genevieve Walden (MS student). San Francisco State University. Phylogenetic analysis of sectional and species level relationships within *Phacelia* (Boraginaceae) inferred from chloroplast ndhF and nuclear rITS sequence data. $500.

Ben R. Grady (Doctoral student). University of Wisconsin. Speciation and Edaphic Endemism in *Eriogonum* (Polygonaceae): A Molecular Systematic Approach. $500.



Phacelia congesta
Clarence A. Rechenthin @ USDA-NRCS PLANTS Database

Congratulations to Linda Kothera!

Linda's research on *Physaria bellii*, funded in part by a CONPS research grant, has resulted in a publication in a scholarly journal. "Assessing the threat from hybridization to the rare endemic *Physaria bellii* Mulligan (Brassicaceae)" by Linda Kothera, Sara M. Ward, and Shanna E. Carney was published in the prestigious journal, *Biological Conservation* (Volume 140, pgs. 110-118). A summary can be viewed at: http://conps.org/research%20grant%20reports/research_grant_report_Linda_Kothera.html.

Thank you to all who have contributed to the Marr and Steinkamp funds. As you can see, your donations make a difference.

CONPS Research Grants Committee

WHO'S IN THAT NAME?

William Weber

by Al Schneider

Dr. Weber, who is Due? Due was my male papillon and my field companion for 12 years until he died on January 8, 2000. Having had the best, I don't need another, but I do have seven Border collies through my daughter Heather; they give me all the dog love I need.

What are your favorite plants? I don't play favorites. This tends to blunt ones interest in the rest.

What plants do you think are the most difficult to identify? The ones that you know least about. Probably for the amateur, it depends on one's equipment. For bryophytes, for example, you need two microscopes and the ability to hand section a single moss leaf. Difficulty in identification usually is a matter of not having looked closely enough to recognize small differences.

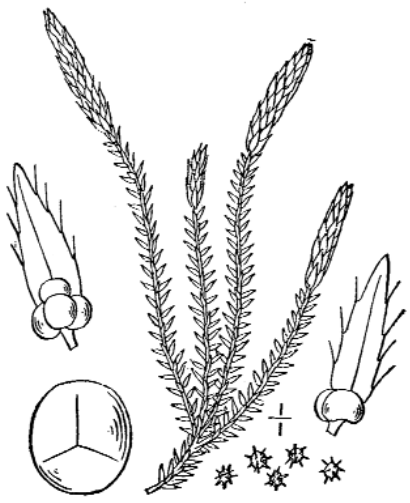
Why do so many different scientific names exist for the same plant? What should we do when faced with a number of scientific names for the same plant? Would you favor the establishment of an international body to arbitrate botanical names? This question is, in most instances, moot. As amateurs, you must come and meet the professional half way. To do this you have to understand some things about nomenclature and its history. I recommend first that you Google "International Code of Botanical Nomenclature (Saint Louis Code) Electronic Version." Names must be recognized as representing points of view of the persons using them. Names will continue to be various and confusing to people who don't understand that in science no one is required to accept a name frozen by some board. Concepts constantly change as information is added. No thinking scientist will tolerate being forced to accept some else's opinions.

Amateur botanists should go to one of the older standard taxonomic texts that do not confuse you with cladistics, numerical taxonomy, chemotaxonomy, DNA, bar-coding of species names, and other fads that are sometimes half-baked and premature, but capture the imagination of folks who are vulnerable.

I recommend highly the book from which I taught in the 1950s: *Taxonomy of Vascular Plants* by George H. M. Lawrence (1951). His chapter on Plant Nomenclature is priceless today. Here is a paragraph:

> "Today [1951 mind you!] there is unity, but not harmony, as concerns nomenclatural legislation, trends, and practices among plant taxonomists… Those lacking scientific perspective, and concerned about temporarily discomforting changes in plant names, would freeze the nomenclature of plants as it now stands and allow no further name changes; others, in the 'interest of stability,' would advocate *nomina specifica conservanda*… There is no uniformity in practice in the delimitation and choice of subspecific categories, and while not a part per se of plant nomenclature, the vacillations and fluctuations in concept of these categories as encountered in the literature do affect the stability of plant names. It has been urged that application of the rules be tempered by judgment (Gleason, 1947). The entire question of the influence of the experimental method in taxonomy on the nomenclature of the future is replete with dynamic potentials and is responsible in part for the introduction into the Rules of the categories nothomorph, apomict, and clone. The influence of increasing cytological and genetical findings surely will be reflected to a greater extent in future nomenclatural regulations and practices."

As amateurs, you are perfectly entitled to use the names you please, provided that they are legitimate according to the rules. If you are old, you grew up with names that for reasons you may not be aware of do not reflect the latest understanding of professionals. These may be right or wrong, but the fact is that we professionals (I have also been an amateur spiritually all my life) use the Rules as our guides. The species are relatively well understood



Selaginella selaginoides 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: 49.

and their specific epithets may remain stable, but we are free to use the generic category to reflect our understanding of the groups. If you think that the vascular plants are undergoing some revolutionary changes (Scrophulariaceae, for example), the FNA treatment of the buttercups has not changed since Benson's monograph in the forties. What is a subgenus if not a genus in disguise that happens to be ignored or 'lost' in the detail of the new treatment. I will have a lot more to say about FNA later.

Why do you emphasize chromosome numbers? Because differences in chromosome numbers are one way of many by which barriers to interbreeding are developed between populations.

Why do you seem to favor the ideas of Europeans? Because so much of our flora turns out to be Middle Asiatic, and because the Europeans have been involved for centuries with the taxa found in the southern Rockies, either in the Holarctic or the mountains of Middle and Southwest Asia. No American botanists have been as deeply involved with the flora of Colorado as I have, for I have been free to study not only the flowering plants, but the lichens and bryophytes. If I had another life to live, I would probably tackle the fungi and the algae.

How did these Eurasian plants get here? They didn't. They were here in habitats they occupy that existed here before the separation of the continents. There are remnants of our flora that are relictual in northern Michigan, Quebec, and the northern Appalachians. Fernald wondered how they got to these eastern outposts. They didn't have to. They were there.

Literature Cited

Gleason, H.A. 1935. *Plants of the vicinity of New York* (1st ed.). Hafner Publishing Co., New York, New York, USA.

Lawrence, G.H.M. 1951. *Taxonomy of Vascular Plants*. MacMillan, New York, New York, USA.

Bill is revising his Colorado Floras and welcomes comments on past editions. Send to bill.weber@colorado.edu.



Deadline Approaches

Submit *Aquilegia* Contributions by 15 October

Articles not exceeding 750-1500 words in length are especially welcome. Previously published articles submitted for reprinting require permission. Include author's name, address, and affiliation; anonymity may be requested. Follow the format from previous issues closely. Spell check.

'Dem Pawnee Medicinal Herbs

by Donald Hazlett

For many things that ail ya, there's a Pawnee herb out there.
One can kill *Streptococcus*[1] and one can strengthen hair[2].
Some are also used in Mexico: *ayer* and *hoy en dia*[3].
Examples are *poleo*[4] and mucilaginous *chia*[5].
The wisdom of cultures now subdued, are still in the souls herbs we use.

The stewards of Pawnee public lands, now have trendy tasks at hand.
Like kill or at least to control 'dem weeds,
Or protect raptors and meet prairie dog needs.
At the same time 4-wheelers roam siltstone hills,
And cattle drink at squeaky windmills.

With a focus on multiple use, raptors and critters, we ignore or don't yet care,
That for many things that 'ail ya, there's a Pawnee herb out there.

1 *Argemone polyanthemos* (Fedde) Ownbey
2 *Sphaeralcea coccinia* (Nutt.) Rydb.
3 translation note: *ayer* = yesterday, *hoy en dia* = nowadays
4 *Mentha arvensis* L.
5 *Salvia reflexa* Hornem.

CONSERVATION CORNER

Colorado and Southern Rocky Mountain Online Herbarium Collaboration

by Sarada Krishnan and Cindy Tejral Newlander

The Denver Botanic Gardens, partnering with CSU, the University of Wyoming, and CU, received a planning grant from the Institute of Museum and Library Services (IMLS) for the development of an integrated, online herbarium of plants of Colorado and the Southern Rocky Mountain region. Through this project, herbarium specimen information will be shared and made available to a wider audience.

The online herbarium will include specimen data with associated images, distribution maps, and associated literature. The creation of this digital herbarium will serve as a model for other institutions that wish to combine shared resources and physical specimens into an online tool. This online herbarium will significantly improve access to desired information about specimens to diverse audiences ranging from scientists to hobbyists, with the ability to access several herbarium databases at once. The ultimate goal of this project is to document biodiversity within the region by providing a platform and opportunity for museums and other institutions to present their own collections data and to make these data available for public use.

To start off the project, an online survey was completed by more than 450 people, including professionals in the fields of botany and horticulture, curators, taxonomists, conservationists, scientists, ecologists, educators, amateur botanists, botanical illustrators, volunteers, teachers, students, faculty, and gardeners. Listed below are some of the findings:

- Most of the respondents used herbaria in the past six months.
- Top three uses of herbaria were for identification, to view morphological features, and to see location data.
- Only slightly fewer than 50 percent had used an online herbarium before.
- Almost 75 percent of the respondents stated that they would use an online herbarium of Colorado and the Southern Rocky Mountain Region that featured specimen label data, images, and geo-referenced map points.
- Most respondents believed that the most important features to be included in an online herbarium, excluding images were maps, species descriptions, and the ability to query multiple items at one time.
- Images were more important to respondents than geo-referenced map points.
- Respondents favor having dynamic images and the ability to download images over other image choices.

The feedback gained from this survey will help guide the design of this virtual herbarium.

As this project progresses, institutions and individuals will be encouraged to contribute specimen-based data, including images of preserved specimens and of voucher specimens living in their natural habitat as well as other resources and expertise to this online repository. Once established, this project will have great implications for research, education, resource management, and conservation by organizing a large amount of data in a single location.

Currently, funding for this project is for the planning phase and, once the model is established, it will take some time to get the digital herbarium up and running. It will take significant efforts from the institutions involved, as well as professionals and volunteers from the botanical community, to make this project a reality. For more information about this collaborative project, please contact Cindy Newlander at TejralC@botanicgardens.org.

Sarada Krishnan is Chair of the Conservation Committee for CONPS and Director of Horticulture at the Denver Botanic Gardens. Cindy Tejral Newlander is Plant Records Manager at the Denver Botanic Gardens.



BOOK REVIEWS

Reviewed by Jan Loechell Turner

Mountain Wildflowers of the Southern Rockies; Revealing Their Natural History. **Carolyn Dodson and William Dunmire. 2007. University of New Mexico Press, Albuquerque. $17.95.**

Carolyn Dodson has a fascination with pollination, which is reflected in her book, *Mountain Wildflowers of the Southern Rockies*, co-authored with William Dunmire. Color photographs by Dodson and Dunmire, accompanied by the illustrations of artist Walter Graf, contribute to the visual appeal of the book, which is brimming with the kind of natural history and plant discovery information that plant enthusiasts crave. Readers will enjoy learning about the leaf movement of lupines and the change in color of the spots on the petals after pollination, the insect thief protection strategy of fringed gentian, the ability of bees to see ultraviolet patterns displayed on petals, and the relationship between the grizzly bear and the fawn lily. Human interactions with plants that occur in the region are not ignored. Although I had lived in Arizona and enjoyed hiking at Mt. Lemmon, I had not realized, until reading this book, that the mountain was named after Sara Lemmon, who collected plants in the Tucson area with her husband, John. The Lemmons discovered mountain parsley (*Cymopteris lemmonii*) and numerous other plants bearing their surname. Economic uses of milkweed fibers, Native American uses of Scarlet Gilia and Rocky Mountain Beeplant, and the history of the iris as the emblem of King Louis VII of France are examples of informative tidbits included in this entertaining book.

Seventy-five plants are arranged by family, not in alphabetical order, but from less to more highly derived. Within families, plants are found alphabetically by scientific name. Two-page entries include the common and scientific species and family names, a description of the plant, close-up color photos of the flowers, and often a photograph or line drawing of the entire plant. Following this are the biological and historical information that readers will find so absorbing, and although the book is presented as a field guide, the latter information is where the appeal of this book really lies. This would be an enjoyable book to curl up with at home on a rainy day.

Carolyn Dodson, who received a Masters in botany from SUNY, is a retired librarian (University of New Mexico library faculty) and taught wildflower identification classes through the UNM Department of Continuing Education. Bill Dunmire, who co-authored *Wild Plants of the Pueblo Province*, *Wild Plants and Native Peoples of the Four Corners*, and authored *Gardens of New Spain*, was a park naturalist with the National Park Service for 28 years and is currently an associate in biology at the University of New Mexico.

Ancient Piñon-Juniper Woodlands: A Natural History of Mesa Verde Country**. M. Lisa Floyd (ed.). 2003. University Press of Colorado, Boulder, CO, USA. $29.95 (paper cloth).**

The natural history of the piñon-juniper woodlands of the Mesa Verde area is the focus of this scholarly, readable book edited by M. Lisa Floyd of Prescott College with the assistance of David Hanna, William Romme, and Marilyn Colyer. Floyd has done a remarkable job of consolidating information from a variety of fields, providing a "big picture" view of an ecosystem that has not been necessarily well understood or valued. Possessing both breadth and depth, the book contains chapters on a myriad of topics including "gnarly old trees," understory plants, fungi and mosses, geology, water resources, biological soil crusts, bats, birds, mammals, reptiles and amphibians, fire history, management concerns, and even ethnobotany. Invasion by non-native plants after some of the more recent fires is one of the topics discussed in a chapter by Romme, Olivia, and Floyd on "Threats to the Pinon-Juniper Woodlands." Marilyn Colyer, who spent much of her adult life working at the park, first as an archeologist and later as a natural resources manager, co-authored a number of the chapters. By documenting Colyer's unique, first hand observations, covering decades in the park, as well as those of other experts, this book makes an important contribution to the literature. Each chapter contains references and supporting information, such as plant lists, tables and charts, and black-and-white drawings and photos. Anyone interested in the Mesa Verde area will find this book to be a valuable addition to his or her book collection.

Jan Loechell Turner is Co-President of CONPS and an Associate Professor at the Regis University Library.



BRANCHING OUT

Phyllotaxis II

By Dick Yeatts

We should make things as simple as possible, but not simpler. A. Einstein

Phyllotaxis (literally "leaf arrangement") refers to the quantitative description of the architecture of plants. For example, the terms "adjacent" and "opposite" applied to branching belie the three-dimensional character of branching. The angle about the stem between neighboring branches (**divergence**) and the number of branches at a node (**jugacy**) are basic measures of plant form, and can be used as characteristics in plant classification. The constancy of divergence, best noted in new growth where environmental effects have not yet corrupted the structure, often persists throughout a plant from basal leaves through inflorescence. Indeed, the simple condition of constant divergence is sufficient to explain many of the remarkable attributes of flowers such as the placement of petals on a rose, the spirals of florets on a sunflower head, and the helical arrangement of bracts on a pinecone.

In temperate climes, for a large majority of species, the divergence is found to be "Fibonacian;" that is, the divergence is about 137.5 degrees, which is an approximation of the so-called "golden angle." (The golden angle, often denoted by the Greek letter *phi,* "ø," is the product of the "golden ratio," times 360 degrees. The golden ratio, in turn, equals (3-square root of 5)/2, which is approximately 0.382).

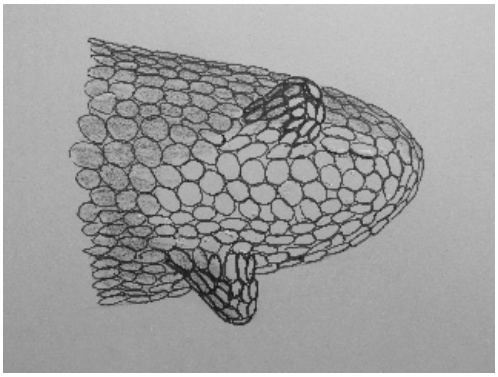


Fig. 1. Sketch of the apical meristem of a plant shoot with two primordia budding on the side.

Genetically based, divergence is established in the growing shoot. Meristem cells (unspecified plant cells…like "stem" cells in animals) in the shoot apex differentiate into specific plant parts by the action of phytochemicals, such as the growth hormone auxin. The specific plant part begins life as a "bump" (technically, **primordium** or **initial**) on the side of the shoot just below the apex (Fig. 1); henceforth, each primordium continues to develop in its own way while the shoot grows longitudinally. For plants exhibiting Fibonaccian phyllotaxis, the primordia appear consecutively at the golden angle around the shoot. Whether the second primordium occurs to the right or to the left of the first determines the "handedness" of the phyllotaxis, usually with equal probability.

If a primordium is to develop into a branch or stem leaf, the shoot continues to elongate as the new plant part develops in its own way at its place on the stem. If, say, the primordium is to develop into a terminal inflorescence, such as a sunflower head, growth becomes lateral as well as longitudinal. The Asteraceae, with their many inflorescence types, exhibit characteristics common to many other taxa, and thus serve as archetypical examples.



Fig. 2. The central region of a head of *Erigeron divergens*. The small squares positioned near the disk florets are theoretically determined locations for those florets.

The most striking feature of the sunflower head is the apparent spiral arrangement of the florets (and ultimately, the fruits). First explained by the Bravais brothers, Auguste (crystallographer) and Louis (biologist), in 1839, the pattern does not result from spiral growth: it is merely an artifact of phyllotaxis. In Figure 2, the black squares centered more or less on the florets of *Erigeron divergens* were computed following a simple mathematical model described below.

Figure 3 is a mathematical model for the arrangement of disk flowers at maturity of an Asteraceae type flower head, such as *E. divergens*. The circles represent the disk florets. Each "floret" is numbered according to its relative age, i.e., in *reverse* of its birth order. The model is constructed as follows: The center of floret one is placed at a point a distance, say, 1 cm (one centimeter) from the diagram center; the center of floret two is then placed at a distance of about 1.4 cm (the square root of two) from the diagram center and at a angle of 137.5 degrees

from floret one; floret three is at a distance of about 1.7 cm (square root of three) and an angle of 137.5 degrees from floret two; etc. The model does not require circular florets, but drawing circles shows the uniformity of packing. Of all possible floret arrangements, golden-angle phyllotaxis with square root distance dependence provides the *most compact packing possible* on a flat receptacle. Thus, minimum plant tissue is required. Mother nature discovered all of this long before mathematicians.

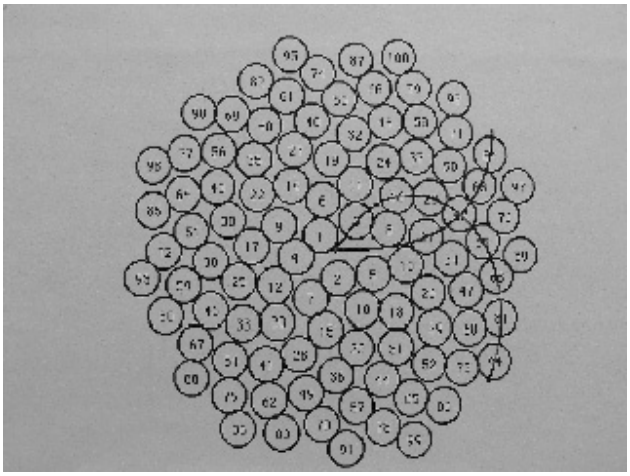


Fig. 3. A theoretical model of a reasonably flat inflorescence with golden-angle phyllotaxis. The circles represent disk florets; the numbers indicate the relative ages of the florets.

The spiral arrangements of florets are called **parastichies** (literally "side row"); the curved lines in Figure 3 identify two parastichies, one clockwise, one counter-clockwise. Notice that there are 21 clockwise parastichies in all, and 13 counter-clockwise parastichies. Moreover, notice that floret numbers in the clockwise parastichy differ by 21, while the numbers in the counter-clockwise parastichy differ by 13. In the case of golden-angle phyllotaxis, the number of parastichies is always a Fibonacci number, and the difference between neighboring floret numbers is always that same Fibonacci number. (Recall the Fibonacci sequence: 1, 2, 3, 5, 8, 13, 21..., where each number equals the sum of the preceding two numbers, starting with 1 and 2). In Figure 2, the number of clockwise parasticies visible in the outer margins of *E. divergens* is 34. The reader might check whether the number of counter-clockwise parastichies is 21 or 55. A Fibonacci number of parastichies is *prima facea* evidence for golden-angle phyllotaxis.

As the number of florets in an array becomes larger and larger, the number of parastichies visible in the outer margins of the array becomes a larger and larger. A sunflower grower can estimate the yield of a head by merely counting the number of parastichies visible in the outer margins. A parastichy becomes visible, now, when the distances between neighboring florets along the parastichy is less than the distances between neighboring florets across parastichies.

As primordia grow, they require more space. And for florets to grow to maturity while maintaining close packing, the receptacle surface must expand and ultimately become rounded; the amount of roundedness depends on the number of florets and their growth rate. Figure 4 shows the longitudinal cross-section of a mature head of *Helianthus annuus*. The smooth curve drawn on the receptacle surface is derived from a mathematical model I developed to model the growth of such a head. (This work is published in *Mathematical Biosciences* 187, 205-221 , 2004.)

Under appropriate growth parameters, but holding the divergence constant, the roundedness of the receptacle can become essentially cylindrical with the more mature florets situated on the cylindrical surface. Herbs such as coneflowers, prairie clover, and mullein exhibit cylindrical inflorescences.

There are many other ways in which Fibonacci numbers are associated with plants (and animals). The references cited in my previous *Phyllotaxis* article provide good starting points for interested readers. Also, in addition, there are applications of Fibonacci numbers to art, music, economics, psychology, and even physical science that some may find fascinating. In any case, it's not the Fibonacci numbers that are special, it's the plants (or animals or whatever….) that are special; the numbers just happen to quantify those special attributes.

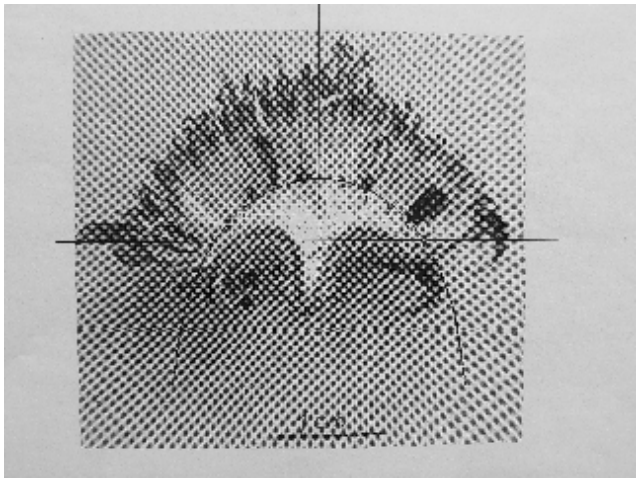


Fig. 4. A longitudinal cross-section of a head of *Heliathus annuus*. The receptacle surface is bounded by a curve derived from a theory of growth of a sunflower head.

Dick Yeatts is a CONPS member. He can be contacted at 1395 Nile Street, Golden, CO 80401.

First Annual Metro Denver Native Plant Garden Tour

by Megan Bowes

Sunday, 8 June was a perfect spring day, which brought some 50 Colorado Native Plant Society members out to tour four unique native plant gardens west of Denver. Members Carol English, Jan and Charlie Turner, Jerry Morris, and Jim and Dorothy Borland graciously offered to open up their private gardens to show some of the many ways we can garden with Colorado's remarkable native flora. While none of the four landscapes grew native plants exclusively, they all exhibited a wide variety of trees, shrubs, and perennials (also known as grasses and forbs for you botanists) native to Colorado and the greater western United States.



Dave Elin and Carol English's Garden

Carol English and her husband Dave Elin began their Morison garden in 2002, after doing construction on their house. Situated on an east-facing hogback slope covered in mountain mahogony, the backyard now features various needle grasses, a collection of *Penstemon* species, and many other native wildflowers, all artfully planted amid native rocks excavated during the house construction. A bubbling fountain entices visiting wildlife and a small buffalo grass lawn makes a pleasant resting spot for their dog. Carol and Dave have done very little to change their native clay soil and, like many of the day's hosts, they water their garden very infrequently, relying instead on plants that tolerate those conditions.

Similarly, current Society Co-Presidents Jan and Charlie Turner began a do-it-yourself landscaping project in 2004, incorporating Colorado native plants into both their front and back yards. Using berms and large boulders as accents, the Turner's lawn-free yard features native plants, as well as some non-native xeric plants. Alluring paths lead visitors through a back yard full of milk vetch, beard-tongue, evening primrose, and much more. Many of these plants came from local plant salvages that Jan and Charlie have assisted with over the years. And most were labeled with an accompanying photo and text — an especially nice treat for those new to native plant gardening!

New CONPS member Jerry Morris is a well-known propagator of dwarf conifers and bonsai, all collected throughout the Rocky Mountain region. His unusual garden features tables and tables of little trees that he meticulously prunes and wires, shaping them into bonsai's formal upright or weeping styles. The front and side yard also display berms of dwarf conifers, some of which he estimates to be hundreds of years old!

Jim Borland's "Native No Water Garden" features an established 5,000 square foot front and side yard that hasn't seen any supplemental irrigation in 12 years. A propagator who had collected seed for most of the more than 80 species woody plants — plus numerous perennials, biennials and annuals — Jim has perfected many different propagation and growing techniques and loves to let nature "choose" the location of many plants. His wife Dorothy, a turf expert, also showed us some of the grass plantings she has been assessing over the years.

The Metro Denver Chapter hopes this will become an annual event and encourages members to open their native gardens up in coming years. Ideally, we'd like future tours to have 4-5 home or public gardens in close proximity to one another so that visitors can minimize the amount of driving between locations. Additionally, we hope to be able to offer different tours in all corners of the Metro Denver. Contact Megan Bowes (303-561-4883 or bowesm@bouldercolorado.gov) if you'd like to help out in the future!

Megan Bowes is Co-Chair of the Metro Denver Chapter and works as a Plant Ecologist for City of Boulder Open Space and Mountain Parks.



Jim Borland's garden.

Society News and Announcements

Membership Survey: The Final Results

Thank you for your input on the survey. With a 50 percent response rate, the membership survey was informative and successful. The initial and final survey results were in agreement. We will be implementing many of the suggestions in the near future.

Colorado Environmental Film Festival

The Colorado Environmental Film Festival (CEFF), hosted by the Colorado Alliance for Environmental Education, will be held 2-5 October 2008 at the American Mountaineering Center in Golden, CO.

The Colorado Environmental Film Festival is an exciting, inspiring, and energizing event that includes world-class environmental films, an engaging exhibition hall with representatives from local and national organizations and companies, topical forums and discussions, and a children's environmental film program.

True to the spirit of Colorado, this event is supported and attended by people who value the natural world and share a passion for the power and beauty of film. For more information or to purchase tickets please visit www.ceff.net.

Colorado Environmental Film Festival

Website News

Webmaster, Al Schneider reports that Cheryl Ames (on her PC) and Julie Crawford (on her Mac) have volunteered to review the CONPS website periodically to catch errors and layout problems, while Janet Weatherby has volunteered to browse Amazon to find new titles to add to the CONPS website Bookstore.

Be sure to read the Botanical News website and your chapter's page, as well, for the most up-to-date news.

Thanks!

CONPS would like to thank David Wright and Nancy Mead for their donation of a scanner and Ann Bartlett for her donation of a computer monitor.

Welcome Linda Smith, CONPS Administrative Assistant

This year, the Board of the Colorado Native Plant Society agreed to hire a part-time contract employee to assist the President, Directors, and other officers with day-to-day operations of the Society. It is with great pleasure that we introduce Linda Smith, our new Administrative Assistant.



Linda has lived in Colorado Springs for 30 years, where she raised her three, now-adult children. She will be retiring from Colorado State University Extension in El Paso County this summer, after 19 years as the Administrative Assistant for the Horticulture Department, and hopes to move to the Longmont/Loveland area to be closer to family. During her years with Extension, Linda taught plant identification of woody plants to the Colorado Master Gardeners in El Paso County, and turned her training materials into the publication "Identification Key for Woody Plants of the Pikes Peak Region."

Prior to working with Extension, Linda was a landscape designer for three years. In her free time, she enjoys hiking, gardening and art projects with her partner Michael and her four grandchildren. Linda is looking forward to meeting and working with CONPS members, with whom she shares a love of the native plants of Colorado.

As our Administrative Assistant, Linda will be responsible for helping with membership, answering questions about the Society, maintaining files; collecting, processing, and re-distributing mail, e-mail, and voice communications; and maintaining books for sales and filing quarterly tax reports. Four months into the position, Linda states, "I'm thoroughly enjoying working with everyone. It's been a very smooth transition for me — from the Colorado Master Gardeners and the staff at the El Paso County Extension Office, to the Society. "Plant People" are the BEST! And I look forward to meeting all of you!"

Please join us in welcoming Linda!

Chapter News and Announcements

Boulder Chapter

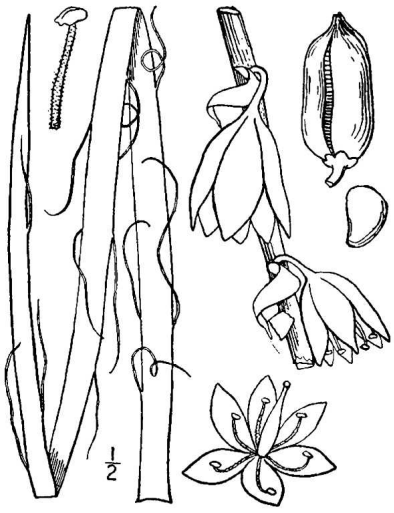
Boulder Chapter meetings are typically held on the second Thursday of each month (October through May) at 7:00 PM. All meetings except the October 9 meeting will be held at the Community Room in the center of the Boulder REI Store at 1789 28th Street, between Canyon and Pearl. The October 9 meeting will be in the North Building of the City of Boulder's Open Space and Mountain Parks Administrative Offices, 66 S. Cherryvale Road (long entrance road approximately 1/10 of a mile south of the intersection of S. Cherryvale and S. Boulder Road). For more information, visit www.conps.org or contact Chapter Co-President Cathern Smith at smith_cathern@yahoo.com or 202-841-4016. Help make 2008 zero waste and bring your own cup and plate.

9 October 2008 **Thursday at 7:00 PM**

Boulder OSMP North Building

Conservation in an Era of Novel Ecosystems

Timothy Seastedt, Professor of Ecology and Evolutionary Biology at the University of Colorado Boulder, will speak about novel ecosystems, biotic communities consisting of new combinations of species under new environmental conditions that are becoming common. Old management styles, focused on removing undesirable species or undesirable conditions, are increasingly unlikely to work. The point is not to think outside the box, but to recognize that the box is moving and find ways to enhance conservation and ecosystem services.



Yucca glauca 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: 512.

13 November 2008 **Thursday at 7:00 PM**

Boulder REI Community Room

Edible and Medicinal Native Plants

Come explore the wonderful world of edible and medicinal natives with Bill Melvin of Ecoscape Environmental Design. Bill will show how native species in the wild and in your garden can provide a wealth of beneficial resources for you and your family.

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

Boulder REI Community Room

Survey of Critical Biological Resources in Boulder County

Stephanie L. Neid, an ecologist with the Colorado Natural Heritage Program (CNHP), 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. The vegetation cover data for 2002 and 2007 were collected with a point-intercept scope that allows the integration of forest canopy cover with ground cover.

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 of ESCO Associates will talk about plant communities occupying surfaces of six age steps between 5000 and approximately two million years old. The oldest plant communities have been "through" 20 glacial-interglacial cycles during the past two 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, today most of the original artwork resides at the University of Colorado's Museum of Natural History.

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

Boulder REI Community Room

The Chatterbox Orchid Reveals it's Secrets - Pollination Biology of Epipactis gigantea at Three Colorado Elevations

Denise Wilson, completing her Master's degree at the University of Colorado Denver, will discuss pollination experiments performed at three elevations in Colorado: 5900 ft south of Grand Junction, 6850 ft south of Carbondale, and 8950 ft south of Salida. The pollination process was observed and recorded. 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, excepting November). Through December, we will meet in the Waring House, just south of the main entrance to the Denver Botanic Garden; however, the Department of Biological Sciences at DU (University of Denver) will host Chapter meetings in 2009. For more information, visit www.conps.org or contact Chapter Co-Presidents Jannette Wesley and Vickey Trammell at vickey4conps@hotmail.com or 303-795-5843. Many thanks to outgoing Co-President Megan Bowes for her energy, abilities, great ideas and bright smiles!

23 September 2008 **Tuesday at 6:00 PM**

DBG at Twilight

We will meet in the Waring House parking lot at 6:00 PM and tour the gardens at twilight with one of the staff. As darkness settles in we will have a short meeting at the picnic tables. Bring your flashlights!

28 October 2008 **Tuesday 7:00 PM**

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

Plan to be entertained by speaker Mary Anne Bonnell.



Penstemon cobaea
Clarence A. Rechenthin @ USDA-NRCS PLANTS Database

Northern Colorado Chapter

Chapter meetings are held on the first Wednesday of the month (Oct- 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. Please join us. For more information, visit www.conps.org or contact Chapter President Denise Culver at 970-491-2998 or Denise.Culver@colostate.edu. The Chapter is recruiting for the office of President.

1 October 2008 **Wednesday at 7:00 PM**

Utilizing and Growing Native Plants in Urban Landscapes

Growing natives in traditional landscape conditions can prove challenging. **Phil Phelan (Bath Garden Center & Nursery)** will discuss how understanding landscape dynamics can help native plants survive and thrive in urban gardens.

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.

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.

"**Chapters**" continues on page 18

Welcome New Members

Bob Anderson
Ken Bing
Bryan Brown
Nancy Burke
Susan Clasen
Stephanie Fedewa
Georgia Hart
Kit Mcchesney & Susan Hofer
Christine Honig
Genie Howell
Mary Kelly
Tanya Knox
Diana Leonard
Doug & Jenifer Loechell
Tracey McInerney
Gail McMullen
Vic Lopez & Whitney McPhetres
Rosemary Moose
Jerry Morris
Betty Naughton
Dianne Norell
Jan Oen
Melanie Palmer
Lisa Ray
Paul Sheldon
Laurel Starr
Amanda Stenjem
Marilyn Stone
Grace Valdez
Karl Williamson
Marianne Wright
Jin Yao
Veronica Zanon

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:

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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

Chapter News

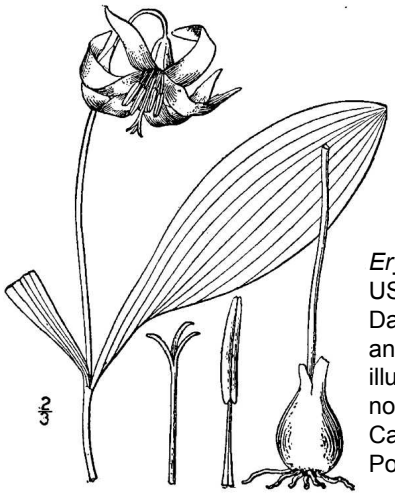
San Luis Valley Chapter

Chapter activities are scheduled throughout the year. For more information, visit www.conps.org or contact Chapter President Cindy (Chinle) Beaver at 719-256-5291 or beaver@fairpoint.net.

Southwest Chapter

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 Southwest Chapter is sponsoring numerous field trips throughout fall. See www.conps.org/southwest.html for details. All trips are free and open to everyone.

The Southwest Chapter has been busy this summer with 15 field trips. Of great interest has been the Chapter's field work at the new Lone Mesa State Park, where we have recorded at least ten county records and have detailed the extent of the rare and recently discovered *Physaria pulvinata*. In Durango, Eve Gilmore has led very successful weekly wildflower walks and in Cortez a group of wildflower guides has led similar walks at the Cortez Cultural Center's Hawkins Preserve. We all look forward to walks and chapter potlucks this fall and winter. Keep in touch with activities at www.conps.org/southwest.html.



Erythronium albidum
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: 506.

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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Vacant

Rare Plant Monograph
Eleanor VonBargen
303-756-1400

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

Oct. 9	Conservation
Nov. 13	Edible/Medicinal Plants
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

Sept. 23	DBG at Twilight
Oct. 28	TBA
Dec. 9	Mary Anne Bonnell

Northern Colorado Chapter

Oct. 1	Native Plant Landscapes

SOCIETY WORKSHOPS

Oct. 4 & 5	Grasses ID
Nov. 1 & 2	Ethnobotany
Nov. 15 & 16	Willows
Jan. 23 & 24	Wetlands
Feb 7 & 8	Astragalus
TBA	Mosses, Ferns, Horsetails
April 25 & 26	Interesting Grass Genera

BOARD MEETINGS

Sept 5	6:00 PM	Montrose
Nov. 15	9:00 AM	TBA

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

TIME SENSITIVE MATERIAL

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