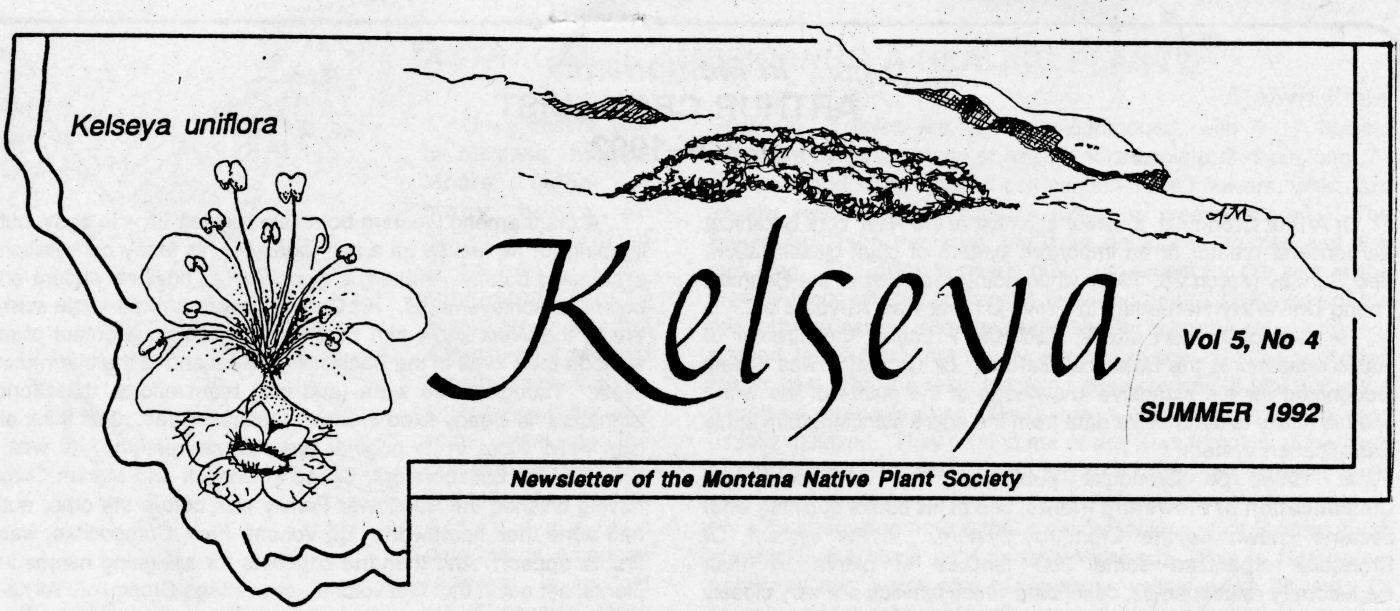


A BOUQUET OF ALGAE:
Plant Diversity and Water Quality in Montana's Streams

– Loren Bahls

The number of plant species living in pristine streams in the Rocky Mountain Region of Montana is significantly smaller than the number in least-impaired streams in the Great Plains Region. This is one of the findings of the Montana Reference Stream Study currently being completed by the Montana Department of Health and Environmental Sciences (MDHES).

Algae, especially diatoms, account for most of the plant diversity in Montana streams. Often fifty or more species of algae inhabit a single riffle. By comparison, not more than a few species of aquatic vascular plants or mosses are typically found in any given reach of a Montana stream.

The MDHES study concludes that **the lower biotic diversity of mountain streams is mainly due to a more harsh habitat than that of prairie streams.** Factors such as lower temperatures, faster flows and lower nutrient concentrations limit the number of niches available for plant species.

> I would rather die in a vat of toads than eat an ounce of pond scum.
>
> *– Old Turkish saying*
>
> American conservation is, I fear, still concerned for the most part with show pieces. We have not yet learned to think in terms of cogs and wheels.... We need knowledge –public awareness – of the small cogs and wheels....
>
> *– Aldo Leopold*

Fish also exhibit this same pattern in species richness. A pristine mountain stream typically has only two or three species of native fish (usually cutthroat trout and sculpin, and maybe bull trout). Its least-impaired counterpart on the plains, however, may support twenty or more species of fish, most of which are native.

Mountain streams and plains streams also support different **types** of algae. While blue-green algae (Phylum Cyanophyta) often dominate the algal biomass of mountain streams, green algae (Phylum Chlorophyta) dominate in plains streams. This is probably because blue-greens have a competitive advantage in nutrient-poor streams because of their ability to "fix" atmospheric (molecular) nitrogen. Diatoms (Phylum Bacillariophyta) are abundant in streams of both regions.

Other data collected by MDHES shows that **when an otherwise pristine stream receives a slight to moderate amount of disturbance or pollution (e.g., from logging, mining or agriculture), plant diversity actually *increases*.** This increase is usually due to an influx of "trash" or "weed" species – the diatom equivalents of dandelions – which may displace indigenous species adapted to the harsh environments of our mountain streams. The net effect is an increase in plant diversity at the local (stream) level, but a decrease in regional and global diversity.

Heavy pollution caused by problems such as acid mine drainage or the discharge of untreated sewage will reverse this trend. Instead of increasing diversity, a *decrease* in species richness results. Disturbance or pollution, especially nutrient enrichment, causes a shift in dominance from blue-green to green algae.

Environmental specialists at MDHES hope to better define the ecological impacts of common pollutants such as nitrates left over from blasting in hard-rock mines. **By measuring the features of impaired and unimpaired communities, we are refining the use of algae and aquatic insects as monitors of ecological integrity in streams. For now, we know that diversity in aquatic plants and insects is a very good gauge of our surface water quality.**

Loren Bahls is head of the Ecosystems Management Section for the Montana Water Quality Bureau in Helena. He has contributed several articles to KELSEYA on Montana's least studied and appreciated flora: diatoms and algae (Spring 1989, Spring 1991).

In Memoriam:
ARTHUR CRONQUIST
1919–1992

Dr Arthur Cronquist, a senior scientist at the New York Botanical Garden and creator of an important system of plant classification, died Sunday March 26, 1992, while doing research at the Brigham Young University Herbarium in Provo UT. He was 73 years old.

He died of a heart attack, said Karl F Lauby, the director of public relations at the Botanical Garden. Dr Cronquist was widely recognized for his extensive knowledge of the plants of the world and his ability to synthesize data from the entire plant kingdom in his classification system.

In 1968, Dr Cronquist published **The Evolution and Classification of Flowering Plants**, one of his books outlining what became known as the Cronquist system. In his system, Dr Cronquist organized some 350 families of plants by their evolutionary relationships, describing which families are very closely related and which are more distantly related. The system has been the most widely used and accepted reference for botanists studying the evolution of plants for nearly 25 years. In deciphering the relationships of the families of plants, Dr Cronquist depended more on his intimate knowledge of many species of plants from field, museum and library studies than on the high-powered computer technology or statistics more popular among his younger colleagues.

He also wrote the **Manual of Vascular Plants of the Northeastern United States and Adjacent Canada**, known as the Green Bible. The manual is the basis for many popular field guides. His two introductory botany textbooks, as well as the manual, are widely used by botany students.

He collaborated on numerous other regional manuals and keys, and was a recognized expert on plants of the Western United States. He wrote or contributed to nearly all the major works on plants of the region: **Vascular Plants of the Pacific Northwest**, co-authored with C Leo Hitchcock, Marion Ownbey, and J W Thompson; the **Flora of the Pacific Northwest** single volume which was derived from the five-volume VPNW; and he was researching a volume on the flora of the Intermountain West at the time of his death.

Born in San Jose, California, Arthur Cronquist earned Bachelor's and Master's degrees from Utah State University, and received his doctorate from the University of Minnesota. After completing his graduate studies, Dr Cronquist was an assistant curator at the New York Botanical Garden for two years. He taught at the University of Georgia and the State College of Washington (now Washington State University). He later returned to the New York Botanical Garden, becoming director of botany and finally senior scientist. He was also an adjunct professor at Columbia University and the City University of New York for more than a decade.

He received the Leidy Medal of the Academy of Natural Sciences in Philadelphia, the Asa Gray Award from the American Society of Plant Taxonomists, and the Linnean Medal for Botany from the Linnean Society of London. Dr Cronquist also served as president of the Botanical Society of America and the American Society of Plant Taxonomists.

He is survived by his wife, Mabel, by two children, John of Placentia, CA, and Elizabeth Crowe of Morrison CO, and by four grandchildren.

Art Kruckeberg, in the Spring 1992 issue of DOUGLASIA, Newsletter of the Washington Native Plant Society, reminisces:

"A giant among western botanists has left us – in body, but not in spirit, for he leaves us a rich legacy of his many contributions to systematic botany. Indeed, a giant both in physical stature and in botanical achievements. Art Cronquist was a remarkable scientist. We in the West know him best for his prodigious output of major work on the Floras of the Pacific Northwest and of the Intermountain West. Though these were (and are) team efforts, the Cronquist 'signature' is clearly fixed in these regional floras. Just think of our own PNW Flora in its original five volume version. Art was way ahead of his collaborators, C Leo Hitchcock and Marion Ownbey, having finished the Sunflower Family well before the other authors had done their homework. So Volume Five, Compositae, was the first to appear. And then the concepts for assigning names to the plants, set out in that first volume, are vintage Cronquist. All serious plantwatchers should re-read the introduction to Volume 5. The ideas for what constitutes a species, a subspecies and a variety were clearly set forth in that essay. Not all botanists would agree with these concepts, but that was often the case with Cronquistian utterances. He was an independent thinker, and usually right, to my mind.

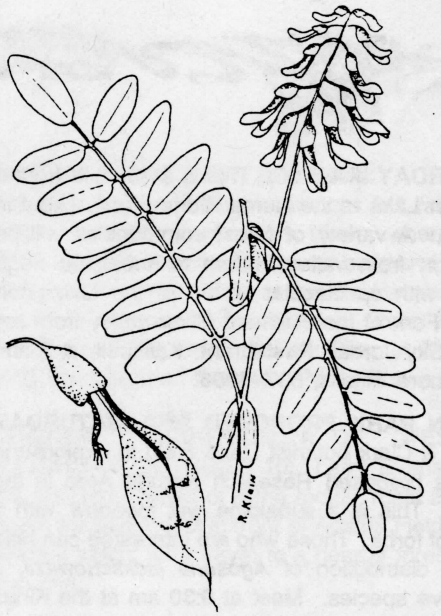
"The team effort with Hitchcock, Ownbey and Thompson to produce the five volume **Vascular Plants of the Pacific Northwest** began in the 1950s, when Cronquist was still at Pullman, then Washington State College. One has to say that Hitchcock was the key member of the team – the coordinator, arbiter and compiler of the volumes, but Art was the innovator and prodigious producer of manuscript. I remember "Hitchy" being astounded at the speed with which Art turned out the treatment of *Carex*, the vast and difficult genus of sedges. And Art's superb handling of the more than 50 species of *Penstemon* was another major, rapid-fire output.

"I was on the phone with Art only days ago in early March. I had caught him in the midst of yet another major contribution, his part of the Intermountain Flora. Art said he was putting the finishing touches on the – you guessed it – Compositae for that vast floral region between the Rockies and the Sierra Nevada. He was overseeing the artist doing the illustrations of sunflowers of the sagebrush country.

"Cronquist's mark in botany goes well beyond regional floras. Always mining the rich veins of taxonomy and systematics, Art ranged into areas of evolution, phylogeny (lineage relationships), concepts of what constitutes a species, and critical evaluation of the latest fads in science. Art was skeptical of the utility of a biological definition of a species. He knew that the reproductive test of a species – fertility within and sterility between species – was hard to apply in plants. So in 1978 he devised a definition that encompassed the real world of the practicing taxonomist. Here is the definition – elegantly simple and practical: 'Species are the smallest groups that are consistently and persistently distinct and distinguishable by ordinary means.'

"...His last moments on March 22, 1992, were spent doing what he did most expertly and serendipitously: gleaning botanical information from dried specimens at the herbarium of Brigham Young University at Provo, Utah.

"So the next time you use the five volume work or the one volume **Flora of the PNW**, pay momentary respect to one of the men behind those outstanding products – Dr Arthur Cronquist, an outstanding scientist."



Astragalus americanus (Hook.) Jones

ASTRAGALUS AMERICANUS, A HEALING PLANT?

– Robyn Klein

On a recent visit to Montana, Michael Moore, author of many books on medicinal plants of the Western US, suggested that I search for an unusual *Astragalus*. Michael hypothesizes that *A. americanus* is the very same plant as the Chinese species *A. membranaceus*. *Astragalus americanus*, American Milkvetch, is an "old world" species which probably came to North American by way of the Bering Strait [which was exposed as dry land by dropping ocean levels during the Ice Ages] thousands of years ago.

If *Astragalus americanus* **is** the same species as *A. membranaceus*, we could be looking at a valuable new medicinal plant. China has used four species of *Astragalus* as immune tonics, *A. membranaceus* being the most popular species sold on the herb market. The root of this particular species has been the object of fascinating research in both China and the United States. This research has shown an ability to help protect the immune system while the body is under stress from chemotherapy given during cancer treatment.

Presently 47 species of *Astragalus* are known in Montana. *A. crassicarpus* (ground plum) is known for its edible fruit. Others, such as *A. minor* and *A. diversifolius*, contain toxic compounds and are responsible for killing livestock. Still another species, *A. gummifer*, which is not native to the United States, is used in the drug industry to impart consistency to lozenges. Thus the various species of *Astragalus* vary greatly in their chemical constituents. *A. americanus* does not have a history of edible or medicinal use, and no known toxicity to livestock.

In 1831 this species was known as *Phaca frigida* var *americana*, but the name was changed in 1878 to *Astragalus frigidus* var *americanus*. Just two decades later the name was again changed to *A. alpinus* var *americanus*, then still later, referred to as *Phaca americana*. And in 1933 it was called *A. americanus* forma *glabrescens*. However, my trusty **Vascular Plants of the Pacific Northwest** (a.k.a. Hitchcock and friends), has settled on *Astragalus americanus*, a name conferred in 1898 by Sir William J Hooker.

American milkvetch can be found from Alaska to Colorado, and east to Quebec and the Black Hills of South Dakota. It prefers stream banks and meadows, often in old forests where spruce trees reign. It is considered an uncommon form with mostly glabrous, inflated, terete and translucent pods. A slender stipe about twice as long as the calyx extends below the pod. It is a perennial with a woody caudex and thin rhizomes which burrow more or less laterally into the soft duffy soil. It can be quite tall, 3–10 dm (12–40"), but the specimens I have found in southwestern Montana were modest compared to those found in central Montana. Leaves are pinnately compound, with 9–17 leaflets which are ovate to oblong or elliptic-oblanceolate, 2–5 cm long, 7–15 mm broad. The raceme can contain 15–40 flowers, which are usually reflexed and yellowish-white or cream-colored. The flowers are 1–15 mm long, the calyx being bell-shaped and 4–5 mm long. The calyx is nearly glabrous except for the cilia of the broadly triangular but scarcely 1 mm long teeth. The wings of the perianth are narrow with the blade shorter than the claw and ear-shaped (auriculate), not nearly concealing the broader and often longer keel. But the real identifying characteristic to look for is the rather unusual stipules. These are 1–3 cm long, oblong, and usually deflexed. They remind me of dog ears hanging at the base of the petioles. I haven't found any other *Astragali* with this large a deflexed stipule.

One interesting note is that a similar looking plant is often found growing in the same as American Milkvetch. This is *Hedysarum sulphurescens*, which also has creamy, yellow-white flowers. Of course, upon a more comprehensive examination one can see the unique keel of Hedysarum, which extends considerably further from the wings and has a squarish shape. The stipules are acute (pointed) and stand upright, while the tips of the leaflets have a fine point which is not present in *A. americanus*. The fruit of *Hedysarum* is also very distinctive, having segmented pods (loments).

I discovered *Astragalus americanus* early last summer in at least six different locations in southern Montana. Wayne Phillips, Lewis & Clark Forest botanist and MNPS member, discovered more robust specimens in some central Montana areas. However, the communities were extremely small. One location had only three plants!

Finding the plant was only the first step, however. I next delivered a freshly pressed specimen to Matt Lavin, curator of the MSU Herbarium, who confirmed my identification. The genus *Astragalus* just happens to be Matt's specialty, and Matt agreed to include this species in a DNA analysis which compares various species of Astragalus according to their genetic makeup. Luckily, a friend of mine was cultivating the chinese species, *A. membranaceus*, and she sent along some fresh leaves for Matt to include in the analysis. She gave us a pressed specimen of the whole plant, which we sent to *Astragalus* expert Dr Rupert Barneby of the New York Botanical Gardens. He later verified this specimen to be *A. membranaceus*.

Meanwhile, Andrea Stierle, a natural products chemist, offered more invaluable assistance. She extracted the fresh foot of *A. americanus* in methanol while I extracted some in ethyl alcohol. Then we compared the methanol and alcohol extracts with a commercial alcohol tincture of *A. membranaceus* using thin layer chromatography (TLC).

The results of the TLC analysis were very encouraging: both extracts of *A. americanus* contained very similar constituents to *A. membranaceus*. This by no means proved these species were the same. However, the DNA analysis helped to form a stronger case. Out of all the species included, *A. americanus* was the closest in genetic composition to *A. membranaceus*. Again, this was an encouraging result but does not yet prove the original hypothesis. More definitive (and expensive) techniques are necessary to elucidate and compare the chemical constituents of both plants.

Despite the lack of final proof, these studies will be very persuasive to herbalists and herb consumers. Though I would not recommend the ingestion of any plant which has neither a history

– continued on page 5

CALENDAR

MEETINGS

THURSDAY, SEPTEMBER 10, CLARK FORK CHAPTER: 7:30 pm, Room 307, Natural Science Bldg, UM campus, Missoula. Steve Shelly, botanist with the Montana Natural Heritage Program will present a talk on "Sensitive Plant Conservation in the Northern Region of the US Forest Service."

WEDNESDAY, OCTOBER 7, VALLEY OF THE FLOWERS CHAPTER: 7:30 pm, at the loft of the Plant Growth Center, MSU campus, Bozeman. Bring 6-10 slides of neat plants you saw this summer, or neat places you visited, to share.

THURSDAY, OCTOBER 8, CLARK FORK CHAPTER: 7:30 pm, Room 307, Natural Science Bldg, UM campus. Larry Evans, a local mycologist, will talk and show slides on "Common Edible and Poisonous Mushrooms of Western Montana." There will be a field trip on the following Saturday (see below).

WEDNESDAY, OCTOBER 21, FLATHEAD CHAPTER: 7 pm, Fish, Wildlife & Parks Bldg, Kalispell. This is our kickoff evening meeting of the year. It's "potluck" - bring slides of spring flowers and summer adventures!

FIELD TRIPS

WORK PROJECTS IN GLACIER NATIONAL PARK, EVERY FRIDAY through SEPTEMBER 18: 9 am-4:30 pm, work projects are available for volunteers, such as taking cuttings, thinning seedlings, weeding, basic carpentry, potting up rooted cuttings or ??? Call Dale Wick or Joyce Lapp (888-5441) for more info; there may be earlier, later or additional dates.

STARK MOUNTAIN FIRE LOOKOUT, SATURDAY JULY 11: Eat lunch at 7,350 ft with fire lookout Virginia Vincent. Visit some of Virginia's favorite subalpine flowers. Meet in the parking lot of Missoula's old General Hospital, across from Ole's, north end of Orange St, at 10 am. We'll carpool from there. Bring a lunch and worm clothes. For more infor or a ride, call Roberta at 251-4545.

SWAN VALLEY RARE PLANT SITES, SATURDAY JULY 11: Visit rare plant sites including The Nature Conservancy's Swan River Oxbow Preserve, home of *Howellia aquatilis* and *Epipactis gigantea*. Meet at the Forest Svc Swan Lake Recreation Area Day Use parking lot, just south of mile marker 72, Hwy 83. Be prepared for swampy ground and mosquitoes. Trip leader Anne Morley, 886-2242, will repeat this trip on **Saturday July 25.**

RAILS TO TRAILS, SATURDAY JULY 18: Join Don Snow to help in compiling a plant list for a one-mile section of the converted railroad right-of-way, west of Kalispell. Call 756-5684 for meeting place and time.

PINE BUTTE SWAMP PRESERVE, JULY 18-19: Meet on Friday evening, July 17, at the Forest Service's Mill Falls Campground on the South Fork of the Teton River, west of Choteau. If you're not able to make it Friday evening, please rendezvous with the group at the campground by 9 am on Saturday morning. Limited motel space is available in Choteau (make arrangements on your own). To reach the South Fork Road from the paved road west of Choteau, watch for the Forest Service sign, and cross the Teton River before you reach the mouth of the canyon. Trip leader is Wayne Phillips (453-0648).

NUMA RIDGE, SATURDAY JULY 25: This is a 15-mile (round trip) hike from Bowman Lake to the Numa Ridge Fire Lookout in Glacier National Park. A variety of forest communities will be viewed in the transition from valley bottom to subalpine ridge (3000' vertical gain), with spectacular vistas of the Livingston Range and the North Fork of the Flathead River valley from the lookout. Meet at the Sky Jordan Restaurant, Kalispell, at 7 am. Call Sam Culotta for more details, 837-4298.

SAMPLE THE ONION PARK PROPOSED RNA, SATURDAY JULY 25: Join Lewis & Clark botanist Dana Field to explore the flora of Onion Park, a proposed Research Natural Area in the Little Belt Mountains. This is a subalpine wet meadow with a tremendous diversity of forbs. Those who are interested can help census and map the distribution of *Agoseris lackschewitzii*, a Forest Service sensitive species. Meet at 9:30 am at the Kings Hill campground on Hwy 89, and bring lunch and water, plus a spare pair of shoes to get wet. A list of species will be provided. For those into hiking or mountain biking, plan to camp out and explore alpine plant communities on nearby Kings Hill and Yogo Peak. More info? Call Dana Field, 791-7676(w) or 453-5446(h).

MOUNT SIYEH, GLACIER PARK, SATURDAY AUGUST 1: A very strenuous climb (not technical, but some Class 2 & 3) to one of the highest peaks in Glacier National Park, 10,014' Mount Siyeh. Beginning near 6000' at Sihey Creek, the route starts in forest, leads to gorgeous subalpine meadows around 7000', then climbs steeply through cliffs and up scree slopes studded with dwarf alpine plants...to an amazing view from the peak. This trips depends on favorable weather, and is limited to ten participants. Call Sam Culotta (837-4298) for reservations by July 28. Meet inside the Logan Pass Visitors' Center at 9 am.

NIMROD WARM SPRING, SUNDAY AUGUST 2: This warm spring is home to the rare giant helleborine orchid, *Epipactis gigantea*. The Nature Conservancy has an agreement with the owner to protect this site. Come help Lolo National Forest botanist Rick Schneider count and map the orchids for TNC. Meet in the UM Field House parking lot at the end of 6th St (across from KUFM) at 10:30 am.

NINEPIPE WILDLIFE REFUGE, SATURDAY AUGUST 8: A combined effort with Flathead Audubon members to help bird and native plant populations by reducing competition from the invasive, introduced *Lythrum salicaria* (purple loosestrife). Bring gloves, footgear to wear in water, and a picnic lunch. Drinks and dessert will be provided. In the afternoon we will look at several native grassland remnant populations with Bill West from the National Bison Range. Meet at 8 am at the Breadboard Bakery in Bigfork, or 9 am at Allentown (between St Ignatius and Ronan). For reservations or info, call Pattie Brown, 837-5018.

SEED COLLECTING IN GLACIER NATIONAL PARK, SATURDAY, AUGUST 29: help collect seed for revegetation projects in Glacier National Park, at Logan Pass or another location - call Tara Luna or Joyce Lapp (888-5441) for details and to arrange free Park admission and camping.

FIFTH ANNUAL MNPS FLOAT TRIP, SATURDAY SEPTEMBER 12: But wait...didn't we have the 5th Annual Float *last* year? That trip got rained out, so we've rescheduled for '92. Load up your

- continued next page

ANNUAL FLOAT TRIP, continued:
canoe or kayak to float a smooth but fairly fast section of the lower Flathead River above Dixon, where we'll search for the small annuals that inhabit gravel bars and wait until late summer to bloom. Meet at 10 am at the Moiese post office (small store at the west entrance to the National Bison Range). Bring lunch. Jointly hosted by the Clark Fork Chapter (Willis Heron, 549-9744, info) and Flathead Chapter (Pattie Brown, 837-5018).

COMMON MUSHROOMS OF WESTERN MONTANA, SATURDAY OCTOBER 10: Larry Evans will guide us through the wonderful world of slime molds, rusts and fungi. Meet at 9:30 am in the parking lot in front of Adams Fieldhouse, UofM Campus. Bring a lunch; we'll travel to a nearby forest area to see what we can find.

FIELD TRIP REPORTS/CHAPTER ACTIVITIES

RATTLER GULCH

On April 25, eleven people ranging in age from one to seventy hiked in the hills just west of Rattler Gulch in Granite County near Drummond. We saw 40 species of wildflowers in bloom and identified 15 others not flowering. Among these was *Lesquerella carinata*, a rare regional endemic found in Montana only on Madison limestone along the Clark Fork River. We also saw rabbitfoot crazyweed (*Oxytropis lagopus*), a species usually confined to the east side of the Continental Divide.

CHAMPION INTL'S PROPOSED GOLD CREEK NATURAL AREA

Peter Stickney of the Forest Service Intermountain Research Lab in Missoula led a field trip on June 13 to a grove of big ponderosa pines at the Primm Homestead on Gold Creek. The area is owned by Champion International, which has expressed an interest in designating the area a natural area. Participants identified 102 species of plants, 16 in flower. Approximately 30% of the species observed were exotics (i.e., non-native).

CABIN GULCH PROPOSED RNA

A group from Kelsey Chapter, Helena, spent a sunny April afternoon walking in the Helena National Forest's proposed Research Natural Area (RNA) in Cabin Gulch. This is the third year the PRNA has been visited, and several additional plants were identified during the trip. Val Jaffe has put together a notebook with each year's trip notes and comments, plant lists, and several pictures. This information will be included in the establishment report for the RNA when it is completed.

CRUS AVENUE PLANTING PROJECT

Kelsey Chapter has also been approached about contributing some time and skills to a planting of native and non-native species along Crus Avenue in Helena, from 11th Avenue to Broadway. This project was organized by the Growing Friends of Helena, and work will be ongoing through Fall 1992.

MNPS SOURCE LIST FOR NATIVE SEEDS AND PLANTS

MNPS now has available the **Montana Native Plants Source Guide**, an updated list of nurseries, seed companies and individuals retailing native plants and/or seeds. Companies dealing strictly (or primarily) in a wholesale capacity have not been included at this time.

Some of the suppliers charge for their catalogs (between $1 and $3), but many have good information on the plants and on seed germination techniques. Gardening with natives is a very rewarding experience, and a great chance to learn about seed germination and plant-habitat requirements.

Cost of the **Source Guide** is $3.00; order from Linda Iverson, HC 88, Box 3733, Big Timber MT 59011. We also have available a book list with many sources for information on how to garden with natives, plus books of general interest to MNPSers. This book list is free (on request) when you order the **Plant Source Guide** from Linda. For the book list only, send her a stamped, self-addressed business-size envelope with your request.

We think you'll find the **Guide** a treasure trove of information, and we welcome your feedback. We will continue to update and add to the list, so any contributions of additional sources are encouraged. Growers or seed sources in-state are most desirable, since those further afield are almost certainly dealing in different ecotypes, even though the species is the same.

A HEALING PLANT...? continued from Page 3:
expensive) techniques are necessary to elucidate and compare the chemical constituents from both plants.

Despite the lack of final proof, these studies will be very persuasive to herbalists and herb consumers. Though I would not recommend the ingestion of any plant which has neither a history of use nor elucidation of constituents, there will be those who will want to experiment with it. Already I have had a request for ten pounds of the root (which I flatly turned down!).

Probably the most popular herb today is the immune tonic herb Purple Coneflower (*Echinacea* spp), which is native to Montana and several states in the Midwest. It is currently in great danger of being over-harvested because of the relentless demand of the herb market. Just last fall I discovered that a company in the Pacific Northwest was planning to dig **1200 pounds** of *Echinacea pallida* from the Crow reservation. It is questionable if the population of Coneflower in eastern Montana can recover from repeated collection.

Commercial harvest of Montana's American Milkvetch would likely decimate our populations. Recent literature which discusses the harvesting of wild medicinal plants concurs that cultivation and extremely cautious harvesting are necessary if we are not to eradicate our medicinal flora. However, even with cultivation the price of seed and root (e.g. $30 per dozen seeds of *A. membranaceus*) will be very tempting to wildcrafters. Several herb growers in Montana have begun cultivation of *A. americanus* this spring. This should help relieve the pressure to harvest it in the wild. Nonetheless, our Herbaria will undoubtedly be asked for the locations of this plant. They need to be cautious and protective in their response.

The initial question remains unanswered. But, if proven positive, could *Astragalus americanus* become a panacea for immune-deficient diseases? Or does it contain dangerous toxins? Regardless, those who proceed toward fulfilling this task must ultimately face the responsibility of protecting our diverse flora.

BIG TREES UNDER THE BIG SKY

– Steve Chadde and Steve Arno

Did you know that Montana is home to the nation's largest western larch tree? Or that the state's largest ponderosa pine is easily accessible west of Missoula?

Records on Montana's largest trees are maintained in a newly reactivated program co-sponsored by the USDA Forest Service Northern Region and Intermountain Research Station, and the Montana Tree Farm Committee. Since 1940, the American Forestry Association has maintained a register of the nation's largest trees. Now Montana's Big Tree program, dormant since the early 1980s, has an updated register, a brochure explaining how to nominate and measure a tree, and a detailed nomination form.

We encourage your nominations. The current list of state champion trees is presented below. Trees are scored using a formula based on tree height, circumference, and crown spread. The total number of points determines the ranking of the tree. Information on all nominated trees is maintained in case of damage or death to the champion.

Table 1. MONTANA'S CHAMPION BIG TREES — March 31, 1992

SCIENTIFIC NAME	COMMON NAME	TOTAL	DBH [inches]	HEIGHT [feet]	CROWN SPREAD [feet]	COUNTY
Abies grandis	Grand fir	311	59	115	38	Lincoln
Abies lasiocarpa	Subalpine fir	227	26	140	18	Lincoln
Juniperus scopulorum	Rocky Mountain juniper	101	22	18	19	Carbon
Larix lyallii	Alpine larch	312	47	152	47	Lincoln
Larix occidentalis	Western larch	417	74	175	37	Lincoln
Picea engelmannii	Engelmann spruce	375	52	203	35	Lincoln
Pinus albicaulis	Whitebark pine	275	54	90	56	Flathead
Pinus contorta	Lodgepole pine	213	32	107	28	Flathead
Pinus flexilis	Limber pine	160	25	76	23	Beaverhead
Pinus monticola	Western white pine	360	53	190	17	Flathead
Pinus ponderosa	Ponderosa pine	451	77	194	64	Mineral
Populus deltoides	Plains cottonwood	433	92	120	101	Ravalli
Populus tremuloides	Quaking aspen	208	32	104	19	Powell
Populus trichocarpa	Black cottonwood	379	73	132	70	Lincoln
Prunus virginiana	Chokecherry	93	15	38	24	Powell
Pseudotsuga menziesii	Douglas-fir	369	64	158	38	Flathead
Salix amygdaloides	Peachleaf willow	279	65	58	63	Fergus
Taxus brevifolia	Pacific yew	40	4	23	18	Flathead
Thuja plicata	Western redcedar	555	127	149	26	Lincoln
Tsuga heterophylla	Western hemlock	180	23	99	30	Lincoln

There are also a number of species with no entries.

SCIENTIFIC NAME	COMMON NAME
Acer glabrum	Rocky Mountain maple
Acer grandidentatum	Big-tooth maple
Acer negundo	Boxelder
Alnus incana	Thinleaf alder
Alnus sinuata	Sitka alder
Amelanchier alnifolia	Serviceberry
Betula occidentalis	Water birch
Betula papyrifera	Paper birch
Cercocarpus ledifolius	Curlleaf mtn mahogany
Cercocarpus montanus	Mtn mahogany
Cornus stolonifera	Redosier dogwood
Corylus cornuta	Beaked hazelnut
Crataegus columbiana	Columbia hawthorn
Crataegus douglasii	Douglas hawthorn
Crataegus monogyna	One-seeded hawthorn
Crataegus succulenta	Succulent hawthorn
Fraxinus pennsylvanica	Green ash
Juniperus osteosperma	Utah juniper
Picea glauca	White spruce
Populus angustifolia	Narrowleaf cottonwood
Prunus americana	Wild plum
Prunus emarginata	Bitter cherry
Quercus macrocarpa	Bur oak
Rhamnus purshiana	Buckthorn
Rhus glabra	Smooth sumac
Salix bebbiana	Bebbs willow
Salix drummondiana	Drummond's willow
Salix exigua	Sandbar willow
Salix geyeriana	Geyer's willow
Salix lasiandra	Pacific willow
Salix lutea	Yellow willow
Salix scouleriana	Scouler's willow
Salix serrisima	Autumn willow
Salix sitchensis	Sitka willow
Sambucus cerulea	Elderberry
Sorbus scopulina	Cascade mountain ash
Sorbus sitchensis	Sitka mountain ash
Tsuga mertensiana	Mountain hemlock
Ulmus americana	American elm

For information on the Montana program, please contact: Montana Big Tree Register, c/o Natural Areas Program, USDA Forest Service, Intermountain Research Station, P O Box 8089, Missoula MT 59807. Or call Steve Chadde at 329-3141 or Steve Arno at 329-4813.

Copies of the 1992 National Register of Big Trees, featuring stunning color photos of a number of national champions and information on over 750 tree species, are available for $2.50 from the American Forestry Association, Big Tree Program, P O Box 2000, Washington DC 20013.

MONTANA NATIVE PLANT SOCIETY *** MEMBERSHIP APPLICATION/RENEWAL

Date_____ New_____ Renewal _____

NAME_____ ADDRESS_____

CITY/STATE/ZIP _____ PHONE _____

STATEWIDE MEMBERSHIP WITH CHAPTER AFFILIATION*

___ $12 I. Individual
___ 16 II. Family
___ 28 III. Business/Organization
___ 4 IV. Yearly chapter dues for Lifetime Members

MEMBER-AT-LARGE (Statewide membership only)

___ $ 8 I. Individual
___ 12 II. Family
___ 25 III. Business/Organization
___ 150 IV. Lifetime member (one-time payment)

***AREAS COVERED BY CHAPTERS:**

BILLINGS CHAPTER - Yellowstone County and surrounding counties in south central/southeastern MT
CLARK FORK CHAPTER - Lake, Mineral, Missoula, Powell and Ravalli Counties
FLATHEAD CHAPTER - Flathead and Lake Counties plus Glacier National Park
KELSEY CHAPTER - Lewis & Clark and Jefferson Counties
VALLEY OF THE FLOWERS CHAPTER - Gallatin, Park, Madison and Sweet Grass Counties plus Yellowstone National Park

All MNPS chapters welcome members from areas other than those counties indicated - we've listed the counties just to give you some idea of what part of the state is served by each chapter. More chapters are in the planning stages for other areas; watch for announcements of meetings in your area. Ten paid members are required for a chapter to be eligible for acceptance in MNPS.

- -

Membership in the MONTANA NATIVE PLANT SOCIETY is on a calendar-year basis, March 1 through the end of February of the following year. New-member applications processed before the end of June each year will expire the following February; those processed after the first of July will expire in February of the year after. Membership renewal notices are included in the Winter and Spring issues of KELSEYA. Anyone who has not renewed by the time the Summer edition of KELSEYA is ready to mail will be dropped from the mailing list/MNPS roster. Please drop us a note if any information on your mailing label is incorrect.

Your mailing label tells your

CLASS OF MEMBERSHIP (I, II, III, IV - see above)
CHAPTER AFFILIATION, if any (B = Billings; CF = Clark Fork; F = Flathead; K = Kelsey; VoF = Valley of the Flowers)
DATE YOUR MEMBERSHIP EXPIRES: If your label reads "x2/92" your membership expired February 29, 1992...please send in your renewal today! New memberships received since July 1, 1992, are good through 2/29/93, and the top line of your label should read "2/93."

MAKE CHECKS PAYABLE TO:
MONTANA NATIVE PLANT SOCIETY

MAIL TO: Montana Native Plant Society
P O Box 992
Bozeman MT 59771-0992

ANNOUNCEMENTS

HERB WALKS WITH MICHAEL MOORE, AUGUST 22-23:

Michael Moore is the well-known author of *Medicinal Plants of the Mountain West*, as well as other books and articles about plants of the Rockies and Great Basin. Learn herbal and medicinal uses of native plants in walks starting from various trailheads in the Bozeman area, organized by Robyn Klein. Cost is $50 per person for both days, and walks run 10 am to 4 pm each day. Full deposit needed by August 1, and maximum class size is 25 students. The class has filled early in prior years, so Robyn warns "Don't wait too long!" Contact her at 6101 Shadow Circle Dr, Bozeman MT 59715, or call 585-9134.

PLEASE WELCOME THESE NEW MEMBERS:

MONTANA

BIG TIMBER
Farwell Smith and
Linda McMillen
BILLINGS
Susan Weekly Horton
Fred Longan
Jennifer and Thomas Lyman
Susan Newell
Bill Roney
BOZEMAN
Rhoda Burrows
Keith Glass

MONTANA, continued

BOZEMAN, continued
Tom and Peggy Olliff
Peggy Owens
BUTTE
Kriss Snyder Douglass
COLUMBIA FALLS
Lora Mehra
DIVIDE
Brian Quinn
GREAT FALLS
Eugene Johnson
HELENA
Lori H Nordstrom
Bonnie Heidel
MISSOULA
Kris Csorosz
Margot Dale
Ted Hess-Homeier
Ann Hubbard
Lisa Johnson
Scott and Jody Lee-Chadde
Robert Petty
RED LODGE
Jeff DeBenedetto
Louise Chandler Hart

COLORADO

GUNNISON
Susan Martineau

FLORIDA

NAPLES
Pat Ashworth

MINNESOTA

PLYMOUTH
William F Ogden

WYOMING

MANDERSON
Wind River Seed

MONTANA NATIVE PLANT SOCIETY
***KELSEYA* Editor**
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PLEASE NOTE: If your label reads x2/92, your membership expired the end of February. If your label reads COMP or COMP2, this is your LAST FREE ISSUE. We don't want to lose you...won't you send us your check today?

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I.2/93
Richard Prodgers
2715 Ottawa
Butte MT 59701

MONTANA NATIVE PLANT SOCIETY

The Montana Native Plant Society is a 501-C-3 (non-profit) corporation chartered for the purpose of learning more about plants native to our state and their habitats, and of sharing that knowledge. Contributions to MNPS are tax deductible, and may be designated for a specific project or chapter, or may be made to the general fund.

Your yearly membership fee includes a subscription to KELSEYA, the newsletter of MNPS, which is published quarterly. We welcome your articles, clippings, field trip reports, meeting notices, book reviews, cartoons or drawings - almost anything, in fact, that relates to our native plants or the Society. **Please include a one- or two-line "bio" sketch with each article.**

Drawings should be done in black ink with a fine-point pen. If you send clippings, please note the source, volume/issue and date.

Changes of address and inquiries about membership in MNPS should be sent to MNPS, PO Box 992, Bozeman MT 59771-0992. All newsletter material should be mailed to Jan Nixon at the same address, and may be typed or on disk (either size) in WordPerfect 4.2 or better.

Advertising space is available in each issue at $5/column inch. Ads must be camera-ready, and must meet the guidelines set by the Board of Directors for suitable subject matter: that is, be related in some way to plants or the interests of MNPS members.

Deadline for the Fall issue is SEPTEMBER 10; please include meeting/field trip notices through early January. The Fall issue of KELSEYA will be mailed the last week of September.

BOARD OF DIRECTORS

PRESIDENT - Angela Evenden	Missoula	329-3485
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Valley of Flowers Chapter - Allen Cook	Bozeman (wk)	994-5059
Billings Chapter - Don Heinze	Billings	256-1624
STANDING COMMITTEES:		
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Education - currently vacant		
Field Trip/Program - currently vacant		
Landscaping/Revegetation - Greg Hallsten	Helena	443-6141
Membership/Outreach - currently vacant		
Nesletter/Publications - Jan Nixon	Bozeman (wk)	587-0120

MONTANA LAND RELIANCE

The character of Montana's private lands is rapidly changing. Unregulated subdivision and other pressures of development pose what seem to be a never-ending threat. What this means in real terms is that Montana's fish and wildlife habitat, agricultural and ranching lands, and cultural and historical values are being irreparably harmed, changing the quality of Montana forever.

Private lands are the vital link between state and Federal lands for animals which don't recognize boundary lines drawn by humans. Conservation efforts on public lands, no matter how effective, can't make up for the loss of sensitive ecosystems on the private lands that surround them. Often, prime calving, nesting and spawning areas are located on private lands where state and Federal agencies can do little to protect them. It is on private lands that the Montana Land Reliance has made a difference.

For the past thirteen years the Montana Land Reliance (MLR) has had a mission: to protect private lands that are ecologically significant for agricultural production, fish and wildlife habitat, and open space. While focusing on its mission, Montana Land Reliance has protected more land than any other local land trust in the nation. Since 1978, MLR has placed more that 77,000 acres under private, direct conservation easement. Included in that total are 2,696 acres of wetlands, 174 miles of streambank, and 19,008 acres of elk habitat.

The tool MLR uses - the conservation easement - is born of private initiative. Granting an easement is a way for landowners to protect their land from inappropriate development. The landowner retains title to the land and the responsibility for its management. The property will be protected for generations to come, despite the actions of future owners.

Granting an easement also can have the added benefit of yielding income and estate tax savings. Many times these savings can insure that the traditional use of a particular land will always be maintained.

MLR is interested in expanding our sources for ideas and leads about possible projects, and to broaden the public's knowledge about different strategies for land conservation. MLR does the technical work involved in establishing a conservation easement, and covers all the costs incurred in that process.

For more information on the Montana Land Reliance and the conservation easement process, write them at P O Box 355, Helena MT 59624, or call 443-7027.

- Carter Calle
Montana Land Reliance

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