Borealis

the newsletter of the

Alaska Native Plant Society

PO Box 141613, Anchorage, Alaska November 2005

Join us at our November meeting!

Campbell Creek Science Center
6881 Abbott Loop Road, Anchorage

Monday, November 7, 7:30 p.m.

November Plant Family Study

Juncus – The Rushes

Presenter: Alan Batten

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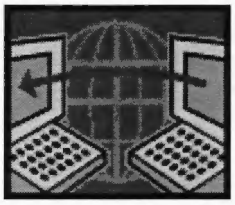
For Latest Information on Alaska Native Plant Society field trips and meetings, check out our website at: http:// AkNPS.org



Arctic Warming – Snowballing?

A gradual lengthening of the snow-free season in Alaska's tundra, and a corresponding northward progression of the growth of shrubs and trees, may be creating a cycle of warmer and longer summers in the Alaskan Arctic according to a new study published in the Sept. 22, 2005, issue of *Science Express*.

"We suggest that a noticeable summer warming trend in Alaska is best explained by a lengthening of the snow-free season there," said Howard E. Epstein, an a co-author of the new study. The scientists determined that the increasing summer temperatures in northern Alaska are likely related to a global warming trend that has led to a longer snow-free season and an increase in the extent of woody vegetation. Both of these changes increase the amount of solar radiation that goes into heating rather than being reflected back to the atmosphere.

Since the early 1960s the spring thaw in Alaska's tundra country is arriving an average of 2.3 days earlier each decade. Plants now "leaf out" about 2.7 days earlier. The first freeze each year is arriving slightly later, allowing plants to extend their growing season. Shrubs and trees are slowly migrating northward. The increasing woody vegetation is further warming the near-surface atmosphere by absorbing rather than reflecting incoming solar radiation.

Because there is a shorter period of snow on the ground, solar radiation contributes to heating, thus accelerating the melting of snow and allowing for more plant growth. Over time, as the permafrost begins to melt, ancient organic matter that has been frozen for thousands of years is exposed, potentially adding more carbon dioxide to the atmosphere.

The result is a positive feedback loop that could continue to raise temperatures in the region and further lengthen the snow-free period each year.

Plant Families for 2005-2006

We always notice the bright flowers but not the backdrop of greens. The "greens" are predominantly of grasses, rushes and sedges. This years PLANT FAMILY discussions will focus on two families: the sedges and the rushes. If everyone is happy with this choice, maybe next year we can tackle the grasses.

What made me want to do these groups was a recent workshop in Anchorage taught by Tony Reznicek of the University of Michigan. Dr. Reznicek is the north American expert on the genus Carex. The workshop dealt with the Cyperaceae—the sedge family. The dominant Alaska genus of this family is Carex. With over 120 species in the genus Carex in Alaska, many folks just shake their heads and call them all Carex spp. The sheer numbers of species make this genus daunting. Dr. Reznicek made identifying sedges almost easy! Well almost easy. On a field trip to Baxter bog, a site where I have led many field trips, he identified 17 sedge species (*Carex*), 3 cotton grass species (*Eriophorum*), 2 tichophorums (*Trichophorum*), 1 bull rush (*Scirpus*), 1 spike rush (*Eleocharis*) and 1 beaked rush (*Rhynchospora*)—ALL CYPERACEAE. Needless to say, that was far more species than I had noted for the site.

So. I thought it would be good to develop a better awareness of these common plants. A schedule of the groups follows.

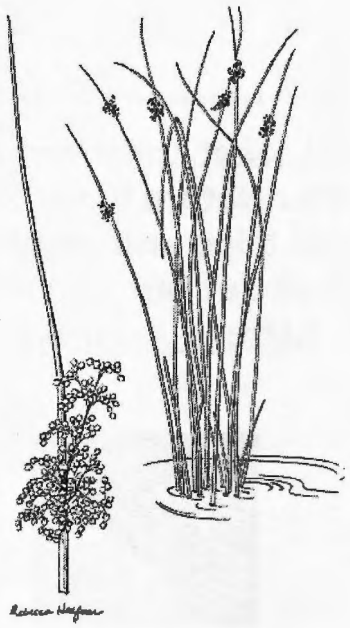
Month and topic	Presenter
November: Juncus—the rushes	Alan Batten
December: Luzula—the wood rushes	Verna Pratt
January: Eriophorum—the cottongrasses	Marilyn Barker
February: Trichophorum and Scirpus—the bullrushes	
March: Eleocharis: the spike rushes	
April: Blysmus and Rhynchospora—beaked rushes	
May: Carex and Kobresia—the sedges	

Think about volunteering to talk about one of these interesting groups at our monthly meetings.

November: The Rushes: Juncaceae.

The family Juncaceae is comprised of 2 genera in Alaska, Juncus the "rushes" and Luzula the "wood rushes".

As a family these are mostly perennial herbs that grow in damp habitats; most are rhizomatous with fibrous roots. Often times these plants are mistaken for grasses or sedges, but on closer examination of both vegetative and floral characters they can easily be separated. The leaves are simple, entire and 3 ranked, mostly tufted at the base of the plant. They are parallel veined and appear like grass leaves but lack the typical ligule of the grasses. The flowers are small, but on close examination show all 4 floral whorls: sepals, petals, stamens and carpels. The sepals and petals are quite similar, so the the term "tepal" I often applied. With a hand lens, the flowers appear quite "lily-like". Like most gramminoid plants, the rushes are wind pollinated. the fruits are muti seeded capsules, not one seeded grains.



Juncus and Luzula are separated from each other on the basis of 2 characters:

Juncus has open leaf sheaths and a many seeded capsule, additionally, the plants are never hairy. Juncus is represented in the state with 18 species.

Luzula has closed leaf sheaths and a 3 seeded capsule, and the plants are usually hairy, though sometimes sparsely represented by marginal cilia. There are 9 species of Luzula in the state.

There is little economic use for this family, unlike the other gramminoid groups (grasses and sedges). A few species are used as ornamentals in gardens, and a some of the rushes (Juncus) are used in basket weaving.

ANPS Sand Point Field Trip

Submitted by Carol Griswold

Seven Alaska Native Plant Society members, four consecutive days of sunshine, two plant presses, and one wonderful host family added up to a spectacular field trip to Sand Point, Alaska, 550 miles southwest of Anchorage. The focus was to add to the 25 herbarium specimens at the UAF collection; over 200 new specimens were collected and pressed.

Jeanette and Fred Kent, assisted by their 13 year old grandson Frank, opened their home, hearts, and island to the group from July 7-11th. We were treated to plant-collecting hikes from beaches, where some rocks were actually ancient petrified metasequoia fossils, to bluffs and rolling hills carpeted with lush meadows sprinkled with rose-purple orchids, lady slippers, Kamchatka rhododendrons, and other lovely flowers, to the highest point on the island at 1549' where feral bison grazed far below in the green meadows with their calves. By the end of the first day the presses were almost full, and subsequently overfilled. Double and triple stacking began the next day, and a large phone book was pressed into action. Collecting finally reverted to those plants which would fit in a phone book. It was very challenging to have so many beautiful plants, such excellent weather, and limited press boards, newspaper, cardboard, and blotters.

Fortunately, no plant collecting took place on a special day trip by fishing boat to adjacent Unga Island, home of the petrified forest and an abandoned village that was once a booming cod fishing and gold mining town. The grayed and weathered buildings are in various stages of collapse, from a slight tilt to flat on the ground and gone. Vibrant wildflowers surround them, unimpressed by the decay of civilization around them. Whales, including humpbacks and fin whales, swam close to the boat, providing a great show.

Visitors Annita and Jenny Magee, Hank and Barbara Weil, Marilyn Barker, Bonnie Tisler, and Carol Griswold worked hard, hiked far, and ate well on this very special ANPS field trip. Many, many thanks to Jeanette, Fred, and Frank for accommodating us all so graciously.

Chenopodium – Native or Introduced?

Roseann Densmore

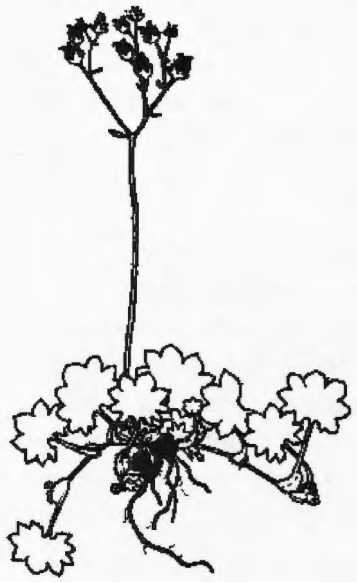
In plant keys, the characteristic that separates *Chenopodium album* [lambsquarters] from *Chenopodium berlandieri* is the seed coat. *C. album* has a smooth seed coat; *C. berlandieri* has a pitted/reticulated seed coat [Ed. Note: hence the common name, Pitseed Goosefoot.]

I found that all the *Chenopodium* that I have collected or examined in the field over the last few years have reticulated seeds. I sent 4 specimens from the Denali/Healy area to Steve Clements, the expert on Chenopodium for the Flora of America. He states that all 4 specimens are *Chenopodium berlandieri* var. zschackii. *C. berlandieri* is native to North America, and ITIS lists *C. berlandieri* var zschackii as specifically native to Alaska (I think we need more work to verify this; also, native to what part of Alaska?)

Please check the seeds of any Chenopodium you find - I am interested in the results, as is Al Batten at UAF.

Chenopodium seeds persist in the soil for hundreds of years and may appear after fire around old cabin sites, etc. I found *Chenopodium album* or *berlandieri* (I didn't collect it) out in the Rosie Creek burn in 1983. It was in a severely burned stand of mature white spruce. It also grew in the same burn around the old sawmill site that supplied wood for fuel to the riverboats on the Tanana in the early 1900's.

MYSTERY PLANT



This small plant is found on the Seward Peninsula, coastal areas in the Hooper Bay area and across the Bering Land Bridge. It is found growing in very wet areas; often in running water. It can propagate by runners and roots easily in the soggy but gravelly soil.

The small leaves are glabrous and have long petioles. They are somewhat kidney-shaped and have many, regular, blunt toothed leaves on long petioles. The flowering stem is 2-5 inches tall and is usually leafless. This is a very showy plant with many small flowers with 5 white, clawed petals, which are set off by bright pink glandular sepals and seed pods and pink stamens. It's a real eye catcher!

To EVERYONE who organized or led field trips during this past beautiful summer!.

YOU MAKE IT HAPPEN!

Mystery Plant Answer

Saxafraga Nudicaulis
Saxifragaceae/saxifrage Family

Amazing Arctic Moss

Genus: *Calliergon giganteum*

Arctic lakes are inhospitable places for plants. Darkness reigns for at least ten months of the year as sunlight is intercepted by a thick layer of ice and snow. The annual average water temperature hovers just above 0°C, reaching a maximum of only 4–6°C at the height of summer. Nutrient levels are also extremely low, particularly nitrogen. With such environmental challenges, it is no wonder that there is a dearth of plant species. And yet, in some polar lakes, a green carpet covers the lake bottom, extending to great depths . These hardy aquatic plants are mosses, ancient plants with small leaves, non-woody stems, and lacking true roots. In Arctic and Antarctic lakes, mosses are typically the *only* multicellular plants present.

The *Calliergon giganteum* is an aquatic plant found growing on the bottom of tundra lake beds and in and around bogs and fens. It is a member of the Siberian tundra biome. Like all mosses, Calliergon giganteum is a bryophyte. They have rhizoids (tiny rootlets) instead of roots. They never have wood stems. They have tiny leaves, usually only one cell thick. There are lots of leaves on the stem. They do not have flowers. They can either reproduce by growing shoots or by sending out spores, which need to be wet to survive. They have two life stages; gametophyte and sporeophyte. There are some ways Calliergon giganteum is unique. It is very slow growing. It grows as slow as one centimeter per year. It also lives a very long time; the shoots live seven to nine years, the leaves live for four. It is brown in color. Its branches are crowded. It is one of the few plants on the tundra. It is "the slowest growing longest living freshwater macrophyte ever recorded" (Amazing Arctic Moss.)

The Calliergon giganteum has adapted well to its cold climate. When it is not growing, it stores nutrients so new leaves can be made quickly next spring. The more leaves the more they can photosynthesize. It is adapted to the incredibly strong winds because it grows near to the ground. Because it can grow under water it is protected from the drying winds and cold, dry air of the frozen tundra. Its long life and slow growth are probably adaptations to the short growing season and the cold.

There are few uses for the Calliergon giganteum. In the arctic, moss covers the ground and warms it up allowing other plants to grow. It is eaten by migrating animals such as birds. Some type of arctic moss was frozen for thousands of years and is helping scientists learn about life on our planet.

The Calliergon giganteum is fairly common. It is one of about 2000 plant species on the tundra, most of which are mosses and lichens.

In recent years, a group of Danish scientists[1] have studied two mosses, *Drepanocladus revolvens* and *Calliergon giganteum*, from lakes in the Canadian High Arctic, trying to decipher the secrets to their perseverance. By examining the shoots of these mosses, which have distinct annual segments, the researchers were able to determine rates of growth, and longevity. As it turns out, Arctic mosses are the turtles of the plant world; growing slowly – as little as 1 cm per year per shoot. The leaves remained green and alive for at least four years, and shoots live for 7 to 10 years. These statistics give these Arctic mosses pride of place among the biology books as the slowest-growing, longest-lived freshwater macrophytes ever recorded.

Their longevity and slow growth are likely a result of the short growing season, the cold temperatures, and the lack of essential nutrients. The long-lived shoots store nutrients, so that new leaves can be made as soon as possible each spring; more leaves translate into more tissue to photosynthesize and hence, more energy. The low temperatures constrain the rate of enzymatic activity, and hence the rate that nutrients can be used, resulting in low growth rates. The lack of nutrients in Arctic freshwaters is extreme; the concentrations of nitrogen found in the tissues of the mosses in this study were much less than what was previously considered the critical concentration for growth!

In Arctic seas, there is a much greater diversity of macrophytes, algae (seaweed) mostly. These plant species must contend with the same cold temperatures, and low levels of sunlight; but marine arctic waters are comparatively rich in nutrients. It is only the nitrogen-starved mosses of the fresh waters that exist in a sleepy hollow state, vegetating on great green carpets at the bottom of Arctic lakes.

Bibliography:

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"Moss Discovered." http://www.ipcc.ie/prcalliergon2001.html (11/4/01)

ANNUAL MEMBERSHIP APPLICATION/RENEWAL

The Alaska Native Plant Society was organized in 1982 by an enthusiastic group of amateur and professional botanists. It is a non-profit educational organization with the goal of uniting all persons interested in the flora of Alaska. Membership is open to any interested individual or organization. If you wish to join us, pleas indicate the category of membership you desire, fill in the form below and mail it with the appropriate remittance to:

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