Borealis

the newsletter of the

Alaska Native Plant Society

PO Box 141613, Anchorage, Alaska November 2003

Join us at our NEXT meetings!

Campbell Creek Center

Monday, November 3rd , 7:30 p.m.

Topic: " The Land Condition Trend Analysis Study at Fort Richardson"--including the rare and invasive plants the study has turned up.

Speaker: Kellie Peirce
Wildlife Biologist at Colorado State University and U.S. Army at Fort Richardson

Monday, December 1st , 7:30 p.m.

Topic: To Be Announced

****

Plant Family Study

"Saxafrage Family"

Nov. Presenter: Marilyn Barker
December Presenter: Verna Pratt

****

You may be receiving this newsletter even if your membership has expired – BUT not again! Don't miss out on future issues, seed exchange and field trip schedules.

RENEW TODAY!!

What The Dinosaurs Ate

By Ginny Moore

Dinosaurs have taken over the Anchorage Museum of History and Art! The famous "T. Rex Named Sue" traveling exhibit is on display until the middle of January and the Alaska Museum of Natural History has put together a complementary exhibit, "Meet The Dinosaurs of Alaska". The Alaskan exhibit includes dinosaur skeletons, bones and fossil finds from around the state. The plant fossils should be of special significance to those of us fascinated by Alaska's native plants. Talk about "native"!

It is easy to see that the evolution of dinosaurs and plants must be closely linked. Plants form the basis of the food chain; changes in vegetation effect herbivores and also have indirect effects on the carnivores that feed on them. Likewise, herbivory will put pressure on the plant groups involved. This is the process of co-evolution - two groups of interacting organisms evolving in response to one another.

Fossils recovered from the North Slope date from the middle and late Cretaceous (up to about 66 million years ago) and span a period of 40 million years. The plant fossils on display give us an opportunity to speculate on possible relationships between Alaskan plants and dinosaurs. Speculations abound.

The table on the next page summarizes the "Age of Dinosaurs", the Mesozoic Era, a time between 230 and 65 million years ago, in terms of plant and animal dominance. Mesozoic means "middle animals", but it was a period when great changes took place in both the plant and animal worlds.

(Continued on Page 2)

From the time that the dinosaurs appeared through to the middle of the Cretaceous period, gymnosperms were the dominant plant group. These plants included seed ferns, cycads, ginkgos, and conifers – all of which are in evidence in the North Slope fossil records. Many of these gymnosperms had evolved features which would deter plant eaters: tough trunks, thick or needle-like leaves with spiny tips, and high levels of toxins, as seen in cycads and conifers today. These plants would also be slow to recover from damage caused by large-scale herbivory.

Based on fossil locations, ferns, horsetails and clubmosses - would have provided fast-growing, low ground cover on the coastal plain. The drier high-ground was dominated by conifers such as *Metasequoia*, (dawn redwood).

The inland forest is the best-studied of the habitats. Seed ferns, deciduous and evergreen conifers, deciduous and evergreen cycadophytes, and deciduous gingkos all grew abundantly. These genera are found in mild to cold temperate forests and some speculate that a single coastal forest may have spread from Alaska as far south as Montana.

Angiosperm revolution

Flowering plants (angiosperms) evolved about 140 million years ago, during the late Jurassic period and dramatically changed the Earth's landscape, quickly taking over most of the ecological niches. These fast-growing, adaptable plants also gave rise to a corresponding boom in the dinosaur world. Most of the dinosaurs that have been found date from the late Cretaceous period, when flowering plants were supplying plant-eating dinosaurs (like hadrosaurs) with plentiful and nutritious food. Some Mesozoic Era angiosperm fossils found on the North Slope include magnolias, laurel, barberry, early sycamores, and palms. The rise of the angiosperms saw a corresponding decline in gymnosperms; many were extinct by the end of the Cretaceous period.

Older theories that the rise of the flowering plants poisoned the dinosaurs and caused their extinction have been largely discounted. Some people, including Bob Bakker, a dinosaur paleontologist, have proposed that it was the dinosaurs that made conditions favorable for flowers. He thinks that flowering plants were able to dominate the land plant niche because of a change in the feeding habits of herbivorous dinosaurs. At the end of the Jurassic dinosaurs like *Stegasaurus* and *Apatosaurus* died out. These dinosaurs reared up on their hind legs to browse the vegetation on the tops of trees and left the gymnosperm saplings alone. In the Early Cretaceous new groups of dinosaurs with a different feeding strategy appeared. They grazed low down on the young plants. Gymnosperms don't regenerate as quickly as angiosperms, so what Bakker thinks happened is that dinosaurs would eat the young conifers and ferns in an area. Then, because they grow much faster, flowering plants could then take over. This theory is not accepted by everyone, but it is interesting. However, it cannot have been a matter of such simple cause and effect. Other factors were involved in the rise of the angiosperms - such as the co-evolution of complex flowers and their insect pollinators.

Plant fossils associated with the bone beds provide evidence that the climate was much warmer than it is at present. Alaska's climate was more like the coasts of Oregon and Washington 68 to 85 million years ago, the period to which paleontologists have dated most of the bones found near the Colville River.

Even though temperatures were significantly warmer than today, high-latitude areas such as the North Slope faced the same problems of seasonal light distribution that we have today. Although winter temperatures were probably cool during the Cretaceous, no plant can survive by retaining its leaves for several months without adequate light. The solution, an adaptation that evolved in both conifers and broad-leaved trees, was to drop their leaves during the dark winter months. The Alaskan plants found exhibit a high degree of deciduous behavior in species that are generally green throughout the year. But if winter is dark, then summer is light. The productivity of plants with 20 hours of usable light each day at 68°F was probably tremendous.

More research will surely improve our understanding of the interactions between dinosaurs and plants, but it is clear that the evolutionary paths taken by both groups might have been very different had it not been for their complex co-evolutionary history.

Mesozoic Era	Million Years Ago	**Plants**: Gymnosperms dominate land; Phytoplankton continue to dominate water)	**Animals**: Age of Dinosaurs/Age of Reptiles; Bony fishes & zooplankton continue to dominate water
Triassic	250-210	Gymnosperms & ferns dominate land	First dinosaurs appear
Jurassic	210-140	First Angiosperms (flowers) appear; gymnosperm forests dominate land	First mammals & birds appear; dinosaurs & insects dominate land
Cretaceous	140-65	Angiosperms spread	Dinosaurs become extinct

The Saxifrage Family: Saxifrage Genus

Introduction

This year we will study the Saxifrage Family- Saxifragaceae. This family has many genera, some with only one species. There are ten genera in Alaska, 30 world-wide. Most Saxifrages grow in northern temperate climates. For our monthly studies, we will group genera base on leaf shape. The Saxifrage genus is very large, so we will divide it into three sections, again mostly by leaf shape or growth patterns.

The word "Saxifrage" is derived from Latin: *saxum* (a rock) and *frango* (to break). By growing in rocks (often small cracks) they give the impression that they are breaking the rocks. Although they don't actually crack the rocks, the plant can trap moisture which may tend to enlarge the space during natural freezing and thawing cycles. All are herbaceous and most have very small flowers. Flowers have 5 sepals, 5 petals and 3,5, or 10 stamens. They grow in a variety of habitats in all parts of Alaska.

November: Saxifrage genus

Presenter: Marilyn Barker

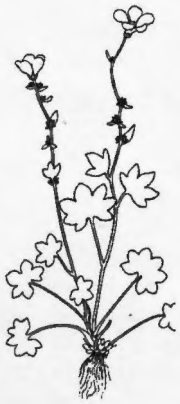
The Saxifrage genus is a group of plants with small flowers (often clawed). Leaves are mostly basal with just a few modified leaves on the flowering stems. The genus includes nine species which can usually be found in rocky soil, mostly in alpine areas. Plants in this genus have very small leaves, are very low to the ground and form small cushions or mats. Most of them have just a few flowers on short stems. *Saxifraga bronchialis* and *S. tricuspidata* have a loose spray of flowers.

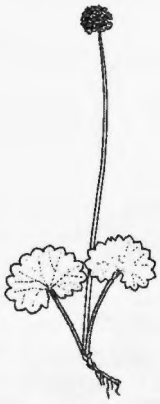
Saxifraga bronchalis ***Saxifraga tricuspidata***

December: Saxifraga Genus

Presenter: Verna Pratt

Most of this section of the Saxifrage genus have cordate or kidney bean shaped leaves, with lobed or notched teeth around the margins. Most have white flowers and grow in moist rocky tundra or stream beds. There are 8 species in this group. Many have flowers in a loose spray on wiry stems.





Saxifraga cernua ***Saxifraga punctata***

Plant Family Presenters Needed

Call Verna at

Genera will be grouped as listed below:

1. Parnassia (3 species)
2. Chrysosplenium (2 species)
3. Tiarella, Tolmiea, Tellima and Mitella
4. Heuchera, Boykinia and Leptarrhena

Dates to choose from are Feb. 2, March 1, April 5 and May 3.

"Killing Them Not So Softly"

The Indiana Native Plant and Wildflower Society's Summer 2003 newsletter contained an interesting article, "Controlling Invasive Species", written by Ellen Jacquart, Director of Stewardship for the Indiana Chapter of The Nature Conservancy. She made some important points about attempting to control invasive species:

1. Be sure what weed you have.
2. Estimate how widespread the invasion is.
3. Try to figure out where it came from, in an attempt to prevent more infestation.

Prevention, of course, is the best method of control. Educating the public to discourage these plants in their own neighborhood, and encouraging landscapers and the highway departments to have a "No Weed" tolerance when purchasing grass seed, provides a first step.

Manual control works for some species but also stirs up soil and invites new seeds to germinate. It works well for annuals or biennials with short seed life, especially if caught early in the invasion. It would, however, require quite a bit of labor and necessitate repeat visits to the area for a few years to eradicate stray seedlings.

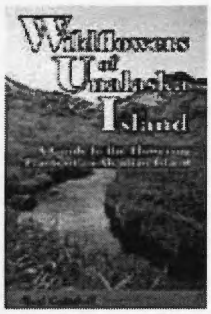
Mechanical control, constant cutting, can be used on annuals or biennials, and is quite effective. However, it is amazing how tenacious some plants can be. Often a 2-3 inch plant of some species will flower and bear seed when conditions such as constant suppression occur. This method works well with sweet clover and garlic mustard but it must be done more than once a season. Not disturbing the soil will discourage reseeding. This method also must be done over a period of years.

Herbicide control is, of course, not to be used carelessly. Glyphosate (Trade Names: RoundUp®, RoundUp-Pro®, Rodeo®, GlyPro®, Accord®, Glyphomax®, Touchdown®) and triclopyr (Garlon® and Access®) are the two types of herbicides usually used in natural areas, because they are relatively short-lived and relatively non-toxic. Of course all still should be used cautiously and timing is important. The most effective time for perennials, shrubs or trees is late summer when the plant food is moving down to the root system. Spring application is nearly useless.

The Nature Conservancy's on-line "Weed Control Methods Handbook" can be obtained at http://tncweeds.ucdavis.edu/handbook.html.

-- Verna Pratt

BOOK REVIEW



Wildflowers of Unalaska Island: A guide to the Flowering Plants of an Aleutian Island by Suzi Golodoff, University of Alaska Press. 2003. $19.95. paperback

The first and only wildflower guide to the Aleutian Islands, "Wildflowers of Unalaska Island", has just been published by The University of Alaska Press. Author Suzi Golodoff does a wonderful job of presenting the flora of Unalaska in a user friendly manner. Plants are organized by families and when more than one plant is represented by a family she includes a characterization of the family.

Plant identification is made easy by using a combination of line drawings and photographs. She is often careful to point out discriminating characteristics between two similar species. For example, she distinguishes the common species of Rumex with excellent line drawings of their fruits. She has taken care to use both common and Latin names for all plants and when possible includes the Unangan (Aleut) name for the plant. Golodoff's book is probably the only book in print to include an index to Unangan plant names.

Along with accurate descriptions of the plants, she includes ranges and ethno botanical information. She has compiled the ethno botanical information from many resources, including first hand stories from the local inhabitants.

Golodoff's book is not intended to be complete but focuses on about 160 of the more common species found on the island and as such is a great tool for anyone interested in the natural history of the area. Casual hikers as well as botanists will enjoy this book.

This book as advertised is "the first and only wildflower guide to the Aleutian Islands" and as such is a great addition to any botanical library.

--Marilyn Barker

Mount Anderson's Namesake

By ANDREW KRUEGER

THE JUNEAU EMPIRE © 2002(Used with permission)

Jacob P. Anderson was one of those rare individuals who turned a hobby into his life's work and a lasting legacy.

Anderson, who spent much of his adult life in Juneau, had a passion for plants - collecting, studying, describing and cataloging all things floral. By the time he died in 1953, he had amassed an enormous collection of Alaska flora and played a major role in bringing the botany of Alaska into the realm of scientific study.

To recognize his mountain of work, Anderson's name was given to a mountain all its own - North Douglas' Mount Anderson, where we pick up our ongoing exploration of place names.

Jacob Peter Anderson was born in Utah in 1874 and spent his childhood in Nebraska. He entered the predecessor of Iowa State University in Ames, Iowa, in 1911, and earned bachelor's and master's degrees in botany.

Jacob P. Anderson holds a cluster of water lilies in 1940 in the Juneau area. Mount Anderson on north Douglas Island was named after the botanist, who spent decades cataloging Alaska plants.

Deborah Lewis is curator of Iowa State's Ada Hayden Herbarium, which houses thousands of plant specimens for study. According to an obituary of Anderson in her files, he traveled to Alaska in 1914 to work at the Sitka Agricultural Experimental Research Station. Three years later, he made another move.

"He went to Juneau to work as a florist, and while he did that as a regular job, he collected plants on the side," Lewis said.

Anderson's curiosity about plants, which began in childhood, grew in the uncharted, largely unstudied field of Alaska botany. Anderson's obituary said the collecting and studying of plants "successively became his hobby and then the guiding passion of his life."

"Once plants are dried and pressed, they last forever," she said. "Anderson's collections look wonderful. They're in great shape and continue to be studied."

A disastrous 1924 fire destroyed much of Anderson's collection, but he started over and rebuilt his collection, traveling all over the state by all means of transportation to find specimens.

David Murray, a botany professor at the University of Alaska Fairbanks and curator emeritus of the herbarium there, said Anderson inspired others in Juneau to collect plants. He worked with members of the Juneau Botanical Club, and a number of photos at the Alaska State Library show him on outings with the club.

In 1941, Anderson returned to Iowa State - with his thousands of plant specimens, the largest Alaska plant collection in existence at that time, according to his obituary - and set about making sense of what he had collected.

Anderson completed a portion of his master's degree work - what became "Anderson's Flora of Alaska and Adjacent Parts of Canada" - before his death 12 years later. He left all his plant specimens to Iowa State, along with money to fund the completion of the identification manual. That work was completed in 1959 by Stanley Welsh, who became a distinguished botanist at Brigham Young University and revised the work several times.

"That has served as one of the primary references (of plants) for the state of Alaska," said Iowa State's Lewis.

Lewis said Anderson's collection is estimated at 11,000 plants personally collected and 13,000 plants acquired across Alaska, and it is still used for research.

In addition to his work with Alaska plants, Anderson also served in the House of Representatives of the Territorial Legislature in the late 1930s and was the territorial supervisor of the 1940 U.S. Census. He received an honorary doctorate from the University of Alaska in 1940.

Interestingly, the mountain here is not the only tribute to Anderson. According to Murray, Eric Hulten - a Swedish botanist whose work with Alaska plants largely paralleled that of Anderson - named a sedge after Anderson: *Carex jacobi-peteri*. That name is now considered a synonym of *Carex micropeda*, Murray said.

"He was a highly motivated botanist," Murray said of Anderson. "He collected all over the state, amassed a large herbarium, suffered the loss of that herbarium by fire, and went right out and continued collecting. ...

"J.P. Anderson is our own, home-grown, professional botanist - really the first for Alaska."

Andrew Krueger's favorite plant is "Viola pensylvanica," and he can be reached at akrueger@juneauempire.com.

CARA WARDLAW-BAILEY & BERYL WARDLAW

BLM's 2003 "Making A Difference" National Volunteer Award Winners
BLM Campbell Creek Science Center, Anchorage, Alaska

Cara Wardlaw-Bailey

Beryl Wardlaw

Cara Wardlaw-Bailey first came to the BLM Campbell Creek Science Center in Anchorage, Alaska, in 1999; she was then a high school student with a budding interest in plants. Too young to drive herself to the Science Center, she enlisted the assistance of her mother, Beryl Wardlaw. This mother-daughter team quickly became chief stewards of the Science Center's herbarium. The pair has collected, mounted, and identified more than 200 plants from the Campbell Tract. They've worked with staff to create an herbarium guide designed to help others access the collection; developed a database to catalog and print labels for all the specimens in the collection; expanded the collection to include specimens from nearby Chugach State Park; begun a digital photo collection of plants on the Campbell Tract; and started a willow collection in the herbarium after attending a willow identification workshop. All their hard work has helped create an invaluable record of plant life on the Campbell Tract. The pair has also trained 19 other volunteers to collect, preserve, and catalog plants for the herbarium. Most recently, they have expanded their efforts to reach students at the Science Center. Beryl, an artist, created a paper-art picture depicting all the features of glaciers for the glacier program at the Science Center. Since 1999, Cara and Beryl have given approximately 400 hours of service to the Science Center, sharing their love of all things natural with growing numbers of area students.

(Reprinted, with permission, from BLM Alaska Frontiers Newsletter, Summer 2003)

"An Excuse For an ANPS Fieldtrip"
OR
"An Update of a Very Old List"

Submitted by co- leaders: Marilyn Barker and Carol Griswold

ANPS summer field trips are always a lot of fun, but the one to Mt. Marathon in Seward on Saturday July 12 was special. Seven ANPS members, three of them new, met at the trailhead at First and Monroe Street. The reason for the trip was a 1922 report by JP Anderson. You can read more about Jacob P. Anderson on page 8.

But meanwhile....a short article was found, and I quote "Seward Gateway, Tuesday, August 1 1922. Flora of Mount Marathon is varied and beautiful. That another attraction has been added to the climb up Mt. Marathon is evidenced by the report turned in by J.P. Anderson, the botanist, who recently made a trip through the territory in the interests of his science. Mr. Anderson is authority for the statement that there are over 150 distinct species of flowers to be found on the slopes of the mountain. Of various hues and sizes the mountainside in places resembles a veritable rainbow of color. Blue, yellow, purple, white, and variegated. It is indeed a sight worthy of the trouble of making the climb. Mr. Anderson, as soon as he has compiled his data, will issue a bulletin covering the various flora he found on the trip through the country."

We never found the final bulletin, but decided to try our luck at finding 150 species of flowering plants on the mountain 81 years after Mr. Anderson's trek. We topped Mr. Anderson by 3 species—the list follows:

Achillea borealis
Aconitum delphinifolium
Agrostis borealis
Alnus crispa ssp. sinuata
Androsace alaskana
Anemone narcissiflora
Anemone richardsonii
Antennaria cf. alpina
Antennaria monocephala
Aquilegia formosa
Arabis lyrata ssp. kamchatica
Arctostaphylos alpina
Arnica amplexicaulis
Artemisia arctica
Artemisia tilesii
Aruncus sylvestre
Astragalus alpinus
Athyrium filix-femina
Calamagrostis canadensis
Campanula lasiocarpa
Campanula rotundifolia
Cardamine bellidifolia
Cardamine umbellata
Carex group II
Carex lachenalii
Carex macrochaeta
Carex mertensii
Carex microchaeta
Carex pyrenaica ssp. micropoda
Cassiope lycopodioides
Cassiope stelleriana
Castilleja unalaschcensis
Cerastium beeringianum
Chrysosplenium tetrandrum
Cinna latifolia
Circaea alpina
Claytonia sibirica
Coeologlossum viride
Conioselinum chinense
Cornus canadensis
Cryptogramma crispa
Cystopteris fragilis
Diapensia lapponica
Draba (nivalis?)
Draba sp.
Dryopteris dilatata
Echinopanax horridum
Empetrum nigrum
Epilobium adenocaulon?
Epilobium anagallidifolium
Epilobium angustifolium
Epilobium hornemannii
Epilobium latifolium
Epilobium luteum
Equisetum arvense
Erigeron peregrinus
Festuca altaica
Festuca brachyphylla
Festuca rubra
Galium triflorum
Gentiana glauca
Geranium erianthum
Geum calthifolium
Geum macrophyllum
Gymnocarpium dryopteris
Heracleum lanatum
Heuchera glabra
Hieracium triste
Hierochoe alpina
Hordeum brachyantherum
Juncus drummondii
Linnaea borealis
Listera cordata
Lloydia serotina
Loiseleuria procumbens
Luetkea pectinata
Luzula arcuata
Luzula parviflora
Lycopodium alpinum
Lycopodium annotinum
Lycopodium clavatum
Lycopodium selago
Menziesia ferruginia
Mimulus guttatus
Minuartia biflora

Minuartia macrocarpa
Moneses uniflora
Osmorhiza sp.
Oxyria digyna
Papaver radicatum
Pedicularis capitata
Pedicularis langsdorffii
Pedicularis verticillata
Petasites hyperboreus
Phleum commutatum
Phyllodoce aleutica
Picea lutzii
Poa alpina
Poa paucispicula
Polemonium acutiflorum
Polygonum viviparum
Potentilla cf villosa
Prenanthes alata
Primula cuneifolia
Pyrola minor
Pyrola secunda
Ranunculus eschscholtzii
Ribes laxiflorum
Rubus arcticus
Rubus pedatus
Rubus spectabilis
Rumex
Sagina intermedia
Salix arctica
Salix barclayi
Salix rotundifolia
Salix sitchensis
Sambucus racemosa
Sanguisorba stipulata
Saxifraga bronchialis
Saxifraga caespitosa
Saxifraga lyallii
Saxifraga punctata
Saxifraga rivularis
Sedum rosea
Senecio triangularis
Sibbaldia procumbens
Silene acaulis
Sorbus scopulina
Spiraea beauverdiana
Stellaria borealis
Stellaria calycantha
Stellaria cf. monantha
Stellaria crispa
Streptopus amplexicaulis
Taraxacum cf. ceratophorum
*Taraxacum officinale
Tellima grandiflora?
Thelypteris phegopteris
Thlaspi arcticum
Tiarella trifoliata
Tofieldia coccinea
Trientalis europaea
Trisetum spicatum
Tsuga mertensii
Vaccinium ovalifolium
Vaccinium uliginosum
Vaccinium vitis-idaea
Vahlodea atropurpurea
Valeriana sitchensis
Veratrum viride
Veronica wormskjoldii
Viola cf. langsdorffii

*Of special notice was the Taraxacum officinale (common dandylion) found well up o the trail. Other invasive species were present but were limited to the vicinity of the trailhead therefore were not included on the list.

MYSTERY PLANT

This plant grows in coastal communities along the Arctic Ocean and most of western Alaska. It can be found in shallow water ponds or in very wet tundra at low elevations. The leaves are long, glabrous, petiolate, wedge shaped with two or three notches at the end. The flowers are white and have 5-8 petals.

ANSWER on Page 11.

Canada Thistle

Prepared by:
US Department of Agriculture
Forest Service- Alaska Region
July 2003

Canada thistle (*Cirsium arvense*) is recognized as an invasive plant throughout much of the United States and Canada. Its common name is deceptive, as it is native to Europe and was introduced to North America in the early 1600s, probably as a contaminant of crop seed. Farmers have long recognized Canada thistle as an aggressive weed, even in its native range. The state of Vermont formally declared it as a noxious weed in the eighteenth century. It is formally recognized as a noxious weed in at least 35 states and much of Canada, and is on Alaska's prohibited noxious weed list.

Canada thistle presumably came to Interior Alaska through contaminated seed. The plant was first found in the Delta Junction area in 1982, due to the aggressive action of the residents, none has been seen since 1987, leaving a cautious optimism that the plant has been eradicated. Unfortunately, the plant is still expanding in Fairbanks and in southcentral Alaska. It has arrived in southeast Alaska in the last five years, probably by hitchhiking as seed in the root balls of ornamental trees and shrubs.

Description

Canada thistle is identified by its prickly stems and leaves, and purple-pink flowers about one inch in diameter (Cover photo). Leaves are oblong, two to six inches long, alternate on the stem, and arise directly from the stem without a distinct leaf stalk. Leaves have a curled wavy surface with prickly-toothed, irregularly lobed edges with wooly hairs on the underside. The plants grow to five feet tall with ridged, branching, rather thin stems.

Life History

Canada thistle favors deep, well-aerated soils with moderate moisture availability, but can grow in a wide variety of conditions. The seeds require some soil disturbance, such as tillage, excavation, or moose activity to gain a foothold in new territory.

New shoots emerge in spring when temperatures average 40°F. Growth is fastest when daytime temperatures reach the high 70s. The plants grow as clumps of leaves (rosettes) close to the ground, until day length reaches 15 hours. Then, the stems bolt," elongating and producing flowers. If mowed late in the summer, the plant resumes growth as a rosette until a killing frost, after which it overwinters underground to resume growth the next spring.

Canada thistle commonly invades disturbed ground, including roadsides, pastures, riparian areas, and sand dunes (Figure 1). It can grow on the edge of wet sites including streambanks, lakeshores, muskegs and ditches. It grows along the edges of forests, but not under dense tree cover. Spread of rhizomes underground is the principal means of reproduction employed by this plant. Thistles also reproduce by seeds, which may be carried great distances by the wind. One plant may produce up to 5,000 seeds in a growing season. Seeds remain viable in the soil for up to 21 years.

Impacts

Canada thistle is a perennial plant with a lifespan of many years. Its roots can grow as deep as 18 feet, but are most numerous within 24 inches of the soil surface. Underground stems called rhizomes spread out from the plant and produce buds, which can grow into new aboveground stems. Rhizomes may grow up to 18 feet per year and produce two to three new buds per foot of growth. The resulting densely packed colonies spread out over time, growing up to 100 feet in diameter. As the colonies grow, they displace more desirable native vegetation, degrade wildlife habitat, and compete with crops and pasture.

Horses and cattle may ingest the seeds and plant them later with an added dose of fertilizer. The dense, prickly spines can irritate and infect the skin of livestock animals. In extreme cases, the thistle may take over an entire pasture. To avoid introducing thistle and other weeds, livestock owners, dog mushers, and gardeners should use only certified weed-free hay and straw. Seeds also move in soil

stuck to farm machinery and excavation equipment.

Be sure to wash equipment thoroughly before moving from a weed-contaminated site. Thistles quickly spread from stem and root fragments (as small as 0.5 inches). Tillage can increase thistle densities.

Guidelines for Control Options

Due to its vigorous growth underground, and its ability to store energy in its roots, Canada thistle is notoriously difficult to eradicate. When newly established plants are found in an area, every reasonable effort should be made to eradicate them to avoid a long, drawn out battle. In Alaska today, we have very few locations with Canada thistle. By treating these few sites now, we can keep this species from becoming permanently established along our rivers, streams, roads, avalanche slopes, and open forest types.

Whatever the treatment method used, repeated effort and monitoring for several years are required to eliminate the plant from a site. At least two years are required to determine whether a particular control method has been effective. Often, a short-term decline may be seen, followed by a complete recovery by the plant. Entire colonies should be treated, as they may not be physically connected underground. Treating just a few plants in a colony may leave the others to take over. Any treatment method should include a plan to reestablish native vegetation or desirable plants in its place. Eradication methods should focus on killing the entire colony instead of prevention of seed production, since its primary means of spread is through vegetative propagation.

Eradication methods studied in the past include introduction of insects or diseases that attack the plant (biocontrol), grazing, hand removal, mulching, mowing, tillage, and herbicides. Biocontrol methods damage individual plants, but have not eliminated entire colonies. Sheep and goats may eat young seedlings, but will not eat established plants. Hand removal is usually impractical due to the difficulty of removing the entire root system, but may work for single-plant colonies if great care is taken to dig up the entire root system. Mulching is ineffective unless the mulch is spread six feet deep over an area 30–40 feet in diameter. Mulching can suppress the growth of competing plants and favors the growth of thistles. However, covering the area with boards or other impenetrable materials will kill the plants if left on the ground for one or two years. Mowing will not kill thistles unless repeated at one month intervals for a period of four years. Tillage will often break up the colonies into smaller pieces, which recover, and may increase infestation density and spread. However, mowing and tillage may be used to encourage the plants to assume a growth stage better suited for control by herbicides.

Herbicides such as glyphosate may be effective in completely eliminating thistle colonies, if care is taken in their application. Glyphosate is a nonselective herbicide, which will kill all types of plants, so care should be taken to avoid treating desirable vegetation. Glyphosate may be applied by spraying or by direct application with a wick or brush. Glyphosate should be applied to plants that are in a vigorous state of growth. It is absorbed through foliage and translocated through the entire plant. Effects may take two weeks to become noticeable, or longer under cool or cloudy conditions. Herbicide applications should not be done immediately after mowing, although repeated mowing will weaken the plant, making it more susceptible to the herbicide treatment, if sufficient time is allowed for the plant to resume growth. Most effective treatments with glyphosate occur at times in the life stage of the plant when photosynthetic products are being translocated from the leaves to the root. Late summer is a good time to do this, especially if the plants have been forced back into the rosette stage by mowing after the day length is less than 15 hours. Application will be ineffective if a killing frost occurs within two weeks of treatment.

Other selective herbicides such as clopyralid; 2,4-D; MCPA; and metsulfuron methyl is recommended for land managers experienced in the use of agricultural pesticides. These are selective on broadleaf weeds, allowing competing grasses to quickly move back into an area.

By: Tom Heutte and Michael Shephard, USDA

Additional information about invasive plants in Alaska can be obtained from your local USDA Alaska Cooperative Extension office, Alaska State Forestry office, or from:

Forest Health Protection
State and Private Forestry
USDA Forest Service
3302 C Street, Suite 202
Anchorage, Alaska 99503-3956
Phone: (907) 743-9454
or: http://www.cnipm.org/index.html

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:

Alaska Native Plant Society,
P.O. Box 141613,
Anchorage, AK 99514

STATUS ☐ New ☐ RENEWAL

CATEGORY

☐	**Full-time Student**	**$ 5**
☐	**Senior Citizen**	**$10**
☐	**Individual**	**$12**
☐	**Family**	**$18**
☐	**Organization**	**$30**

Name _____

Address _____

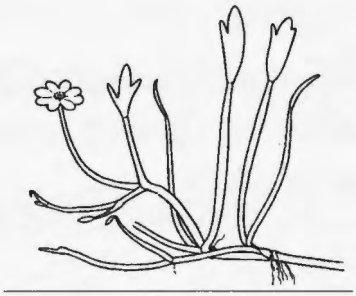
City: _____ State_____Zip_____

Telephone: (Home)_____(Work)_____

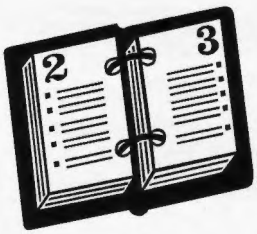
Membership is on a calendar year basis.

MYSTERY PLANT ANSWER

Ranúnculus Pallàsii
Ranunculaceae/Buttercup family



To all the field trip leaders and facilitators who made summer field trips possible!



UPCOMING PLANT EVENTS

November 3

Alaska Native Plant Society: 7:30 p.m., Campbell Creek Science Center off 68th and Lake Otis

November 7

Anchorage Garden Club: "Garden Design" presented by Erma MacMillan; Pioneer Schoolhouse, lower level; located at 3rd and Eagle Streets; 7:30 p.m. Programs are free and open to everyone.

November 13

Wildflower Garden Club Workshop -"Orchid Repotting Clinic," 10 a.m., Wayne Toups will be guiding with his orchid expertise; Bring your orchids. Contact Sally,

November 18-19

Anchorage Garden Club: 43rd Annual Holiday Flower Show at the Wells Fargo Bank 301 W Northern Lights Blvd., Free & open to the public

December 1, 2003

Alaska Native Plant Society Monthly Meeting: 7:30 p.m., Campbell Creek Science Center.

Alaska Native Plant Society
P.O. Box 141613
Anchorage, AK 99514

Renew your membership before January!

Don't miss out on future issues, Seed Exchanges, and Field Trip Schedules!