Borealis

the newsletter of the

Alaska Native Plant Society

PO Box 141613, Anchorage, Alaska October- November 2016

Join us at our Next Meetings!

Monday, Oct. 3, 6:00 p.m

POTLUCK & SLIDE SHOW

Regrouping after summer activities, members have an opportunity to share up to 10 photos of their activities this past summer. The food is shared by all and always wonderful.

Monday, November 7, 7:00 p.m

Main Topic: "Fungal Insulation"

Speaker: **Philippe Amstislavaskai**
Philippe and his colleagues at UAA have been "growing" insulation – what you'd put in buildings and around pipes – from the mycelium of a common white rot fungus. Their goal is to provide Alaska with a lucrative industry producing cost-competitive, biodegradable thermal insulation..

Endangered Plants: ***Astragalus robinsii***
Leader: Ginger Hudson

Saxifrage Family Plant: ***Arctostaphylos***
Presenter: Mike Monterusso

For the latest information about ANPS events and field trips, go to www.aknps.org/

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Reconnecting

INDOOR BOTANY

Welcome to another indoor season of activities of the Alaska Native Plant Society! It was an incredible summer with warm weather and early flowering and berries galore. The ANPS field trips were a great success and there will be many pictures and stories to share at our season opening meeting on October 3.

THE OCTOBER MEETING BEGINS AT 6PM WITH A POTLUCK.

General membership meetings are open to the public and are held on the first Monday of every month from October through May. Various guest speakers give presentations on topics related to native plants and ANPS members give informative slide shows, plant family, and mini- botany talks. The October meeting starts earlier as it is a potluck where members bring 5-6 slides of their summer adventures to share.

Please be sure to maintain your membership in order to support the Society and receive the Borealis newsletter and field trip announcements. Membership is on a calendar year basis, so new membership and renewals will now count towards the 2017 calendar year. There is a membership form on the back page of this newsletter as well as on our website: www.aknps.org.

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The **2016 Alaska Botany Forum** is approaching! This year's meeting will be held at the NPS Office on Geist Road in Fairbanks on Monday and Tuesday October 17-18. The conference includes presentations on a variety of research and conservation projects on the Alaska flora and is free to attend.

Conference organizer Carl Roland is requesting abstracts from interested presenters. He has requested a short document with the title, authors, short abstract (<250 words), preferred presentation length (number of minutes), and preferred date and time for your talk. Please submit abstracts ASAP to Carl (carl_roland@nps.gov). The final deadline for submissions to be considered is October 1, 2016.

Verna's MYSTERY PLANT

This small alpine plant has been quite elusive, until a group of us went on the Barrow Field Trip this summer. Our timing was perfect for the flowers, and once we landed the weather was real cooperative. We hit the right week.

The small numerous rosettes have overlapping layers of wedge shaped leaves terminating with three to five rounded lobes. They form loose mats on the tundra of Northern Alaska and mountainous area of s. Central and the Aleutian Chain. The flowering stem is 2 to 4 inches and has a couple of bracts and a few 5-petaled small white flowers and a few small bracts.

. Answer on Page 6.

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ALASKA NATIVE PLANT SOCIETY

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Mini-Botany	Dennis Ronsse
Field Trips	Marilyn Barker

Newsletter ("*Borealis*")

Editor	Ginny Moore

Borealis is published bi-monthly, fall through spring. Articles may be sent to Ginny Moore, , Anchorage, AK 99516.
Phone or FAX: , E-mail: elfinwood@gmail.com

Lichen: It's Now A Love Triangle

Lichen might not seem terribly romantic, but there is a hidden love story found within this unique organism. You see, lichens are not actually a plant, but in truth are a love story between fungus and algae. And, even for lichen, love isn't always what it seems from the outside.

Kids (and grownups) the world over have learned about the symbiotic relationship involved in lichen by remembering the mnemotic "When Freddy Fungus met Alice Algae they took a Lichen to each other". They got married, and now Alice does all the cooking (algae can photosynthesize) and Freddy built their home (fungus prevents algae from drying out).

For nearly 150 years, lichens have been the model organisms of symbiosis. Now researchers have uncovered an unexpected third partner embedded in the lichen cortex or 'skin' -- yeast.

Fifty-two genera of lichens collected from around the world include a second fungus — single cells, called yeasts, of a previously unknown order now christened Cyphobasidiales. Toby Spribille of the University of Graz in Austria and colleagues report the finding online July 21 in *Science*. (link below)

The first example discovered illustrates why these yeasts might turn out to be more than parasites or mere hitchhikers, says study coauthor John McCutcheon of the University of Montana in Missoula. He and Spribille started the research out of curiosity. They wondered how the yellow, toxin-bearing, thready tangles of lichen called *Bryoria tortuosa IEdible Horsehair Lichen)* could have the same fungus and the same algal partner — and thus technically be the same species — as the brown, toxin-poor lichen traditionally called *B. fremontii*, (Inedible Horsehair Lichen). The researchers looked to see which genes were active in each lichen in hopes that some discrepancy could explain the difference in forms. What they found had nothing to do with the alga or previously known fungus. Instead, ample genetic activity of more abundant yeasts in the toxic *B. tortuosa* turned out to be the most striking disparity.Gene-activity results suggest that the yeasts could be what's making the difference between the forms, maybe even synthesizing toxic vulpinic acid.

Spribille and McCutcheon assembled a large team of scientists who tested many other fruticose and foliose lichens. They found that basidiomycete yeasts were present in many of the species they examined. The yeasts turning up across this widespread class of lichens might explain other mysteries, such as why researchers have largely failed to re-create lichen partnerships in the lab.

So now the old mnemonics about Alice Algae and Freddie Fungus are outdated. Roger Rosentreter suggested a new one that was published this summer by Adolf Ceska in BEN

The Modern Lichen
By Roger Rosentreter

Times are tough out in Nature these days
Housing costs and utility bills are up
So Freddy Fungus and Alice Algae decided it was best to get a roommate.

So the cellist, Yo-Yo (Ma) yeast moved in.
With some great music, harmony and a bit of genetics,
The three Freddy, Alice and Yo-Yo made music together.

Yo-Yo has them covered on the outside,
Alice brings in the groceries, and
Freddy holds them all together.

***B. fremontii* and B. tortuosa: 2 Lichens, 1 Fungus**

From http://www.waysofenlichenment.net/ a website exploring forest lichen of Western North America

Reference: Spribille, T. et al. 2016. Basidiomycete yeasts in the cortex of ascomycete macrolichens. Science. Published online 21 JUL 2016 DOI: 10.1126/science.aaf8287

Herbaria – Warehouse of Birth Certificates for Plants

A herbarium is a collection of preserved plants stored, catalogued, and arranged systematically for study by professionals and amateurs from many walks of life. A collection like this is a vital reference when you need to identify a plant and also serves to fix forever the identity of thousands of plant names. A herbarium is a cross between a museum of priceless artifacts and a warehouse of birth certificates for plants; and acts as a source of information about plants - where they are found, what chemicals they have in them, when they flower, what they look like. Preserved plant specimens can be used to provide samples of DNA and to validate scientific observations. A herbarium is therefore of immense practical use and of fundamental importance to science. Individual plants or parts of plants, are preserved in various ways, stored and cared for over time so that current and future generations can identify plants, study biodiversity and use the collection in support of conservation, ecology and sustainable development. The curator of a herbarium is responsible for its long-term care, maintenance and development.

In Alaska there are 5 recognized herbaria that are part of the **Consortium of Pacific Northwest Herbaria** (CPNWH), a group of 36 herbaria in the Pacific Northwest hosted by the University of Washington. The consortium database is a powerful online tool for search over 2.5 million herbarium specimens.

- **University of Alaska Anchorage Herbarium (UAAH)**

UAAH is managed by the botany program. It houses approximately 15,000 specimens , 97% of which originate from Alaska, with the remaining specimens originating from Yukon, Washington, and Oregon. Regional emphases include otherwise poorly known areas such as Bering Sea Islands, Bering Glacier area of south-central Alaska, and remote regions of southwestern and northwestern Alaska.

- **University of Alaska Fairbanks Herbarium (ALA)**

ALA contains more than 260,000 specimens of non-vascular and vascular plants and is the major research herbarium in Alaska. It also includes plants from other states, Canada, Greenland, Fennoscandia, Japan, and Russia. Roughly 2/3 of the specimens are vascular plants (gymnosperms, fern and fern allies, flowering plants) and one-quarter are cryptogams (bryophytes and lichens). The remainder are marine algae and a small collection of fleshy fungi. Supporting collections derived from these specimens are 1) seeds, 2) pollen slides, and 3) microscope slides of plant parts (non vascular plants).

- **Alaska State Museum, Juneau (JBCC)**

JBCC houses 5,000 specimens from the Aleutian Islands; Alaskan northern coast; Southeastern Panhandle; Pribilof Islands; Alaskan interior as far north as Nome and Barrow.

- **Forest Service, Alaska Region USDA (TNFS)**

This Sitka based herbarium holds 11,650 specimens including vascular plants and bryophytes of southeastern Alaska; lichens of southeastern Alaska, northwestern Alaska, British Columbia, Sweden, and Central and South America.

- **University of Alaska Juneau (ALAJ)**

Much of ALAJ used for research on Exxon Valdez oil spill. Additional information on impact of oil spill to marine algae is associated with ALAJ. Specialty: Marine algae; Alaskan coastal waters; Pacific Ocean.

Help & Learn at the UAA Herbarium

Two opportunities to learn how to mount and care for plant specimens:

Justin Fulkerson, Collections Manager at the Herbarium, has graciously offered to open the Herbarium to volunteers to learn the proper way to mount plant specimens. This is a win-win. You will work with the specimens and learn more about individual species and Justin will get a nice set of mounted plants for the UAA Herbarium. No experience is necessary, only requirement is a love of plants.

Specimens have been collected and identified. They are in need of being mounted on herbarium sheets before they can be accessioned into the collection.

Dates and times are: Friday October 14 from 1-4 PM and Saturday October 15 from 1-4 PM

Group size is limited to 6. Contact Marilyn Barker at to participate. Parking is free Friday afternoons and all day Saturday.

Ericaceae Family

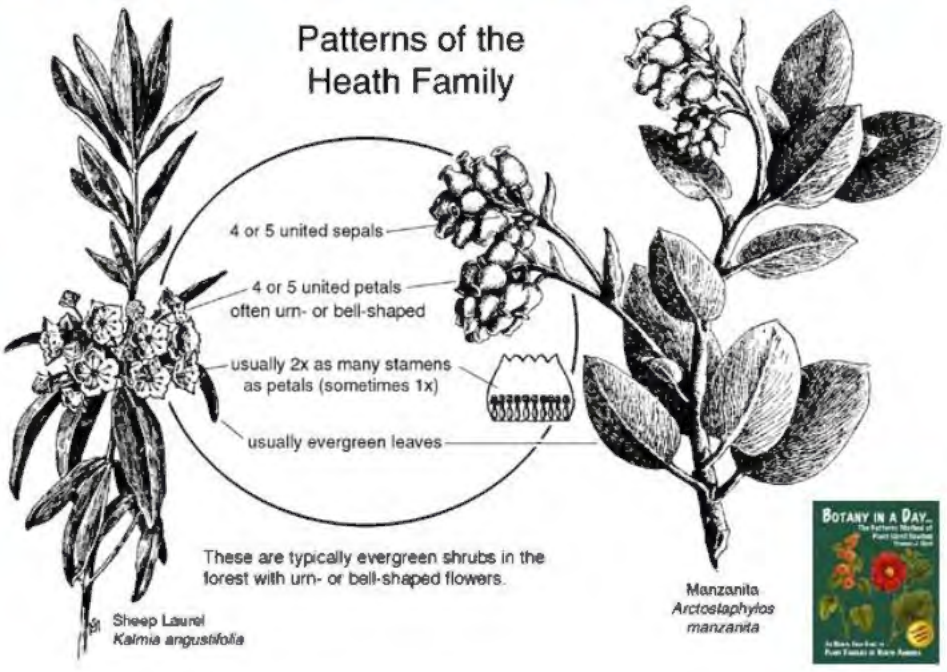
The Plant Family study that has been chosen for examination at the ANPS meetings each month in 2016-2017 is Eericaceae. Mike Montebello will begin our study in November by highlighting *Arctostaphylos*.

The Ericaceae family consists of more than 70 genera and over 1,900 species. The genera within this family are grouped together based on similar reproductive structures (e.g., flower, fruit, and seed), general appearance, and preferred growing conditions. Generally, the ericaceous plants are woody and range in size from low ground covers to small trees over 20 feet tall. Most plants in the family exhibit an alternate branching habit while some members may be opposite or whorled with simple flowers either solitary, or in axillary or terminal inflorescences. In most cases, the members of this family express fused petals, such as the cupcake-cup appearance of mountain laurel (Kalmia) and carry twice as many stamens as petals. Fruits are typically a capsule or berry. Ericaceous plants are widely distributed on acidic, well-drained soils through most of the temperate climate zones and are found at high elevations in mountainous areas of the tropics.

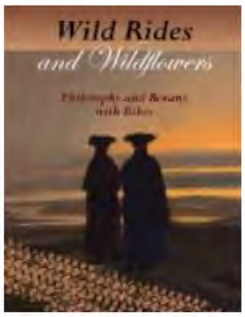
Plant Structure

Ericaceous plants have shallow-spreading root systems with a majority of their root masses located within a few inches of the soil surface. Roots are fine, fibrous, and lack root hairs. Moisture and nutrient absorption occur directly through the mass of fine, fibrous roots that these plants produce. The lack of root hairs is one reason that ample moisture is required during the summer months. Ericaceous plants, especially rhododendrons and blueberries, also rely on a close symbiotic relationship with myccorhizae in order to adequately acquire nutrients and water from the surrounding soil.

Ericaceous plants are made up of at least three growth habits including surge growers (e.g., rhododendron, pieris, and mountain laurel), continuous growers (e.g., azaleas), and basal growers (e.g., leucothoe). Young and vigorous surge growers may make three different growth surges during the growing season that will reduce summer flower bud set. As they mature, the number of surges reduces to one and typical flower buds set in mid to late summer. Young plants may become long and leggy due to the surges of growth. Continuous growth plants such as young azaleas may begin top growth in the spring and not stop until autumn. As with the surge plants, as the continuous growth plants mature, growth tends to stop in mid summer rather than continuing to the fall. Finally, the basal growing plants such as Leucothoe tend to have sparse branching and become straggly if not monitored.



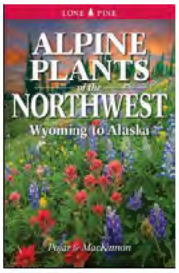
FROM OUR BOOKSHELVES



Wild Rides and Wildflowers

By Scott Abbott, Sam Rushforth
Paperback: 377 pages
Publisher: Torrey House Press (March 25, 2014)

Here is a book about sharing several passions:
Review from Booklist: Although Utah Valley University professors Abbott and Rushforth hail from very different academic backgrounds—Abbott teaches humanities and philosophy, while Rushforth is currently the school's dean of science and health—for years they have shared a passion for tooling their mountain bikes down Utah's slice of the Great Western Trail. When they set out to write a book about their biking observations, they envisioned an inspired hybrid of tranquil philosophy and nature writing. As it turned out, their meddlesome middle-aged angst and jousting personalities entered into the mix, and what emerges here is more of a mixed record, in a stylized journal format, of their spirited verbal exchanges, insights into both biking and academia, and their ardently expressed values about preserving America's endangered wilderness. What sounds on the surface like fodder merely for a longer magazine piece actually works admirably well across its 300-plus pages, mostly because of Abbott and Rushforth's knack for entertaining readers with quirky philosophical quips, layman botany lessons, and wittily delivered true-life anecdotes. --Carl Hays



Alpine Plants of the Northwest: Wyoming to Alaska

By Jay Pojar andAndy MacKinnon

Publisher: Lone Pine Publishing, Edmonton, Alberta.2013

If you have used the field guide "Plants of the Pacific Northwest Coast" by Jay Pojar and Andy MacKinnon, published in 1994, you are already aware of the comprehensive, easy to use format these authors produce. That early book is one of the most recommended references and it is especially nice that it covers the Alaska coast up to Prince William Sound. It features 794 species of plants commonly found along the Pacific coast from Oregon to Alaska, including trees, shrubs, wildflowers, aquatic plants, grasses, ferns, mosses and lichens.

More recently, in 2013, these two respected nature writers have collaborated again to produce an outstanding field guide to the plants that grow at high elevation, above the tree line, in the mountain systems of the Western Cordillera. The book features more than 500 plants fonnd in the alpine regions of western North America. MacKinnon's and Pojar's rich and engaging notes on each species include descriptions of the unique characteristics of each plant, as well as of its habitat and range. Both books feature full-color photographs throughout.

Andy MacKinnon is a respected biologist who serves as a technical advisor on old growth forest research to the B.C. Ministry of Forests. MacKinnon, also a registered professional forester, is adjunct professor at the School of Resource and Environmental Management, Simon Fraser University. He is the author of six Lone Pine books on the plants of Western Canada and the Pacific Northwest. Dr. Jim Pojar is executive director of the Canadian Parks and Wilderness Society - Yukon chapter. He spent 25 years as an internationally respected forest ecology research scientist with the B.C. Forest Service. He is the author of numerous books and scientific papers related to the boreal forest, aspen parklands and coastal ecosystems.

Mystery Plant Answer (See Page 2):

Saxifraga cespitosa

Tufted Saxifrage

Saxifragaceae / Saxifrage family

From What We Gather – Around the Web

Sunflowers Dance In The Sun – But How is it Done?

Sunflowers are known for their sun-facing posture. That's how they got their name. In a study published in the journal Science in August of this year, researchers at the University of California Davis demonstrate that there's more happening than a simple desire to catch more of the sun's rays. The study describes how they learned that sunflowers, just like animals, have a circadian rhythm — an internal clock that can be set to the external world.

This rhythm controls their growth and how they bend and sway to the sun's movement in the sky during the day; they also reorient overnight in anticipation of the sun's rise from the east. And this extra work pays off: Eastward-oriented flowers are warmer than westward-oriented flowers, and this extra bit of warmth attracts pollinators.

Scientists have long been aware that plants have internal clock genes just like those of animals. However, senior author Stacey Harmer from UC Davis wanted to know the link of these clock genes with a hormone called auxin that control stem growth.

To do this, Harmer and her team tried to stake the flowers so that they would not move. The constrained, frail flowers were then moved to an indoor growth chamber, where the sunflowers swang back and forth even without a direct response to the sun. The observations revealed that the sunflowers are not solely controlled by the sun but have internal rhythms too.

The study reveals that this circadian regulation results to a light-responsive growth, where the eastern side of the sunflower's stem elongate more during the day while its western side grow more actively during night.

This movement results to a 180-degree rotation of the sunflower in order to capture sunlight. After a sunflower is fully grown, the plant's internal clock stops. The plant is then in a permanent position to face the east to harness sunlight during the morning and facilitate pollination.

“Before our experiments, few studies -- the latest more than 50 years ago -- had assessed how sunflowers returned at night, and they had suggested some internal ‘habit’ was involved but did not directly implicate the clock,” said Benjamin Blackman, an assistant professor of plant and microbial biology at UC Berkeley and co-author of the study.

Harmer explains via Seeker that plants are very sensitive to their environment and possess senses that are alike with what humans have. However, the difference lies on the "time scale of many of the responses."

"Plants actually have color vision. They have several families of photoreceptors that allow them to see many different wavelengths of light: UV, blue, green, red, far-red," Harmer continued. "Note that plants can see wavelengths of light that humans can't detect (UV and far-red). They use these photoreceptors, in particular, those that are sensitive to blue light, to track the sun."

The study has shown that sunflower growth is affected by light as well as an internal circadian rhythm. The internal clock's behavior and adaptive functions to control plant growth could open doors to future applications in other species, Blackman noted. You can watch a short, entertaining video describing this research on Youtube.

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

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☐	**Organization**	**$30**

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