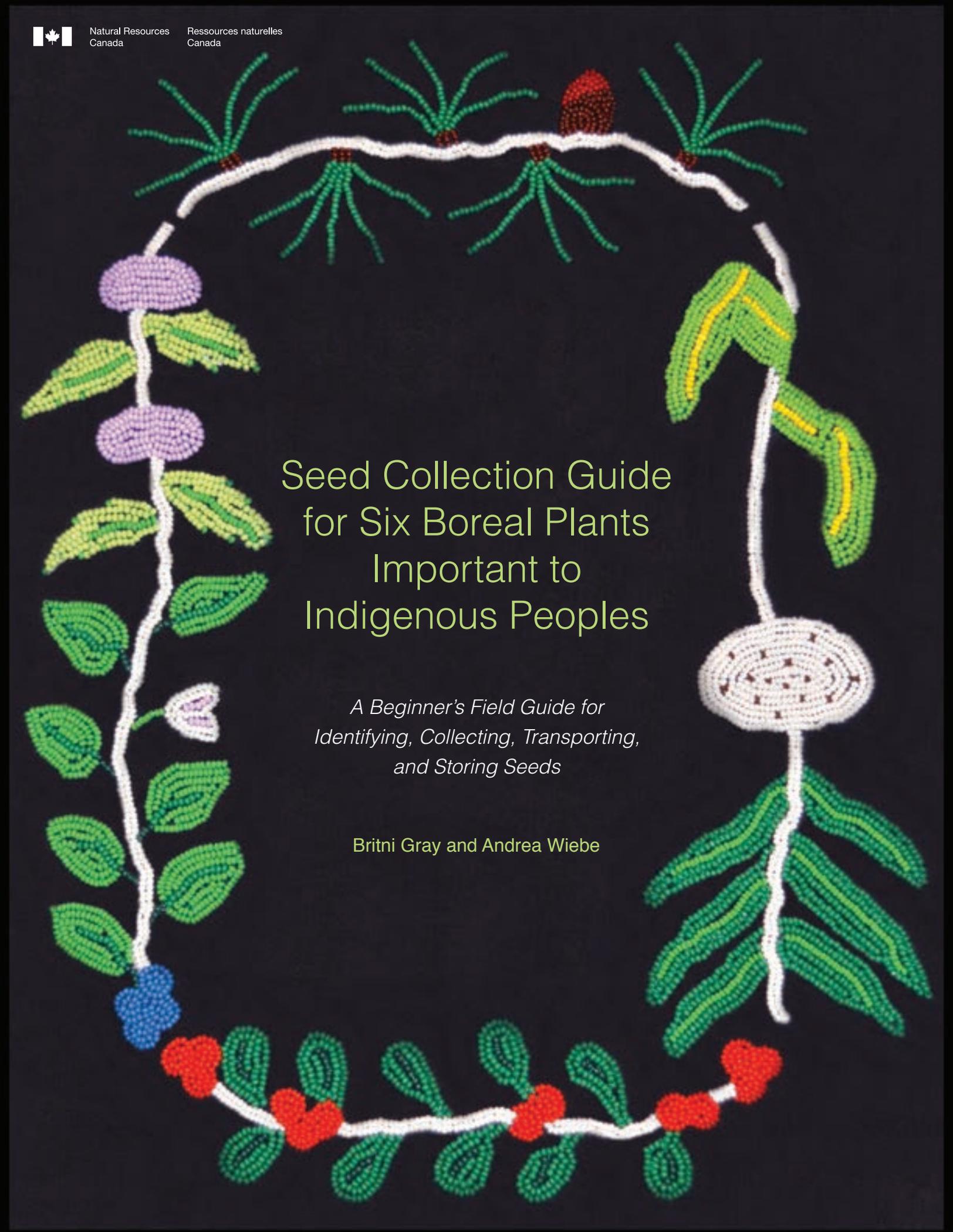




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Seed Collection Guide for Six Boreal Plants Important to Indigenous Peoples

*A Beginner's Field Guide for
Identifying, Collecting, Transporting,
and Storing Seeds*

Britni Gray and Andrea Wiebe

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Britni Gray and Andrea Wiebe

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Cover image: Britni Gray, Andrea Wiebe, and Cindy Shaw used traditional beading techniques to create artwork for the cover, which represents the plants in this seed guide.



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Foreword

Over the last decade, Natural Resources Canada (NRCan) has expressed growing interest in supporting development of underrepresented groups (including women and Indigenous peoples) in the natural resources sector. In 2018, NRCan committed to inclusion by signing the Gender Equity and Inclusion Charter, which was soon followed by a call to submit related proposals to the first NRCan Innovation Fund. The SINEWS (Sistering Indigenous and Western Science) project, submitted a successful proposal to the Innovation Fund. The SINEWS project was designed in the spirit of reconciliation to support pairs of undergraduate female students (one Indigenous and one non-Indigenous) to work together on a project of their own design. Pairs of students directed their research toward the interests of Indigenous communities and to bridge the gap between science and Indigenous traditional ecological knowledge. One of the eight pairs of women supported by the SINEWS project in 2019 was a partnership between Britni Gray and Andrea Wiebe. They identified the need for this seed collection guide to help identify and sustain plants important to Indigenous peoples during reclamation (following bitumen extraction from oil sands in northern Alberta). The team worked hard to develop a close working relationship with the Janvier First Nation to ensure that they focused on plants that were of cultural significance to the community. With the guidance and help of community educators, Britni and Andrea also produced educational materials and guides for teachers (kindergarten to grade 9); these guides were designed to help both Indigenous and non-Indigenous youth learn more about plants of Indigenous cultural significance that live in the forests around them. Dr. Dani Degenhardt, a reclamation research scientist with the Canadian Forest Service, provided Britni and Andrea with mentorship and support throughout the term of the project. This seed guide was produced with respect for Indigenous ways and culture and is not only informative, but also beautiful. Both students learned traditional beading to design and create a stunning cover for the seed guide, which represents the species within the guide. Britni and Andrea wanted to express Indigenous values related to the circle of life (from seed to mature plant); they worked with local artist, Rachel de Haan, to design representations for each plant in the guide. Rachel produced images of plants, flowers, fruits, and seeds. I could not be more proud of this pair of women. They worked together as a team, with their mentor, showing commitment to cultural engagement and personal development. I have great respect for these two women, and I hope this project will be the first of many contributions to reconciliation.

Cindy Shaw,
SINEWS Project Lead

Acknowledgements

We thank all the individuals who made this project possible through their contributions, collaborations, and support. We want to thank Dr. Dani Degenhardt (CFS) for being our mentor, for always keeping us on track, and providing us with every opportunity imaginable; Dr. Jean-Marie Sobze and Ryan O'Neill from the Boreal Research Institute of NAIT and Ann Smreciu and Kim Gould of Wildrose Consulting, all of whom gave this project the chance to flourish through field work, community connections, and their immense knowledge; Catherine Brown (NAIT) and Jessica Hudson (NRCan) for sharing their knowledge on seeds and contributing plant photos; Laura Newstead for offering us a place to explore plant photography; Dr. Shauna Lee-Chai (InnoTech Alberta), Kiran Cahoon (NRCan), and Sarah Dewan (NRCan) for their insights into working in Indigenous communities; Michelle Filiatrault for her GIS expertise; and the wonderful ladies at the Alberta Biodiversity Monitoring Index (ABMI) for their willingness to help us use ABMI's vast database as a resource.

We thank Hunter and Lewis Cardinal for taking the time to meet with us, for helping us to create community connections, and for their immensely important traditional knowledge; as well as Ashley Cardinal, Northern Forestry Centre's (NoFC) Reconciliation Intern, for planning so many great activities to participate in as well as a safe place to speak and share.

We thank Conor Kerr from Norquest College for insightful conversations around the implementation of a land-based learning curriculum. Thanks also to Susan Skillings and Lori Burke for taking the time to discuss the steps towards land-based learning that are important in today's education system.

A massive thank you to Rachel de Haan, a truly gifted artist, for her amazing illustrations of each plant's life cycle, for collaborating, and for being such a wonderful person.

We thank our SINEWS Elder-in-Residence, Florence Large, and the Northern Forestry Centre's Elder-in-Residence, Heather Poitras, for their constant support, their belief in the SINEWS project and everything it stands for, and for always being there to guide, support, and teach. Thanks to Bryana Rousselle and Catherine McNalty for being the true backbone of this project, for making all of the SINEWS teams' dreams come true, and Cindy Shaw, without whom, SINEWS would not have existed to change so many people's lives for the better. To the countless individuals who helped with the SINEWS program in large or small ways and the Northern Forestry Centre's staff who aided us along the way — you have made a world of difference.

We extend our deepest thank you to the community of Janvier, Marina Nokohoo, Pam Nokohoo, their families, and all the other wonderful community members we had the opportunity to speak with: your warmth and kindness has left a lasting impact on us. We greatly appreciate the experiences you have given us and hold them close to our hearts. Thank you for making this project possible.

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Introduction

This publication is intended to be a source for plant identification and seed collection and is available to all who wish to use it. We aimed to make the information in this guide illustrative for beginners, interesting for community members, and informative for practitioners in the field of reclamation and restoration. It is with sincere hope that the content provided in this book will be expanded upon and make its way into a more comprehensive guide that incorporates a larger collection of species. This seed collection guide includes information on how to distinguish when seeds are ready to be collected, where seed sources may be available (geographically), a forecasted timeframe for seed collection, and some basic information on seed cleaning and storage.

The focus of the SINEWS program is, at its core, centred on the importance of meaningful relationships, and those relationships took us to some wonderful places. This guide is a culmination of contributions from multiple sources of knowledge, and we acknowledge the valuable offerings that both Indigenous and scientific perspectives provide us and help us to understand our world in different ways. It is our hope that respectful and meaningful relationships continue to lead us all toward a deeper level of mutual understanding, improving connections to one another and to the Land.

The plants are identified using their common, scientific, and Dene names; the source for the Dene names is the book "Aboriginal Plant Use in Canada's Northwest Boreal Forest". All GIS maps were produced using publicly available Alberta Ecodistrict layers (<https://www.nrcan.gc.ca/science-and-data/science-and-research/earth-sciences/geography/topographic-information/10785>) provided by the Natural Resources Canada branch of the Government of Canada in conjunction with ABMI's publicly available Species and Habitat Raw Data (<https://www.abmi.ca/home/data-analytics/da-top/da-product-overview/Species-Habitat-Data.html>).

Larch, Tamarack

Larix laricina

nídhe, nithe



Identification

Plants: Deciduous tree with soft, pale green or greenish-blue needle-like leaves in clusters of 10–20. Clusters of leaves are attached in a whorled pattern around each branch. Needle-like leaves turn pale yellow and fall off in autumn months. Bark is thin and brown to red in colour, although smooth when young, it becomes scaly and cracked in appearance as it matures. The trunk growth pattern is upright with a pyramid shape of branches attached, and the tree can grow up to 20 m in height.

Cones: When young, cones are reddish green in colour. As they mature, cones turn light brown and begin to open, appearing globose or

rose-like in form. Cones are egg-shaped to round and have rounded scales. Cones sit and point upwards on the branches.

Seeds: Each scale on a cone produces two seeds. Mature seeds are small, light brown, and egg shaped with a wing-like structure on one side. Trees are ready to produce seed after about 5 years of age, and continue doing so until about age 20.

When to Collect

New cones can be found in April–May, but seeds are ready to be picked mid-August to mid-September.

Larch, Tamarack

Larix laricina

nídhe, nithe

Where to find

Tamarack can be found in wet areas in the boreal regions of Canada and Alaska such as muskegs, swamps, fens as well as drier sites. However, tamarack prefers areas with little to no shade. It grows in medium to coarse textured, slightly acidic soils.

How to Collect

Cones can be hand picked off of the tree when they are light brown in colour and starting to open up. Cones can also be found in squirrel caches or near fallen trees. Collect cones as early as possible to minimize seed loss and maximize seed collection.

How to transport, clean, and store

Cones can be picked and stored in paper bags or burlap sacks for transport. The collected cones should also be kept cool during transport. Seeds may be removed from the cones with

some combination of agitation, air drying, and low heat. To avoid spoilage during long-term storage, store seeds within 3–8% moisture content (very dry).

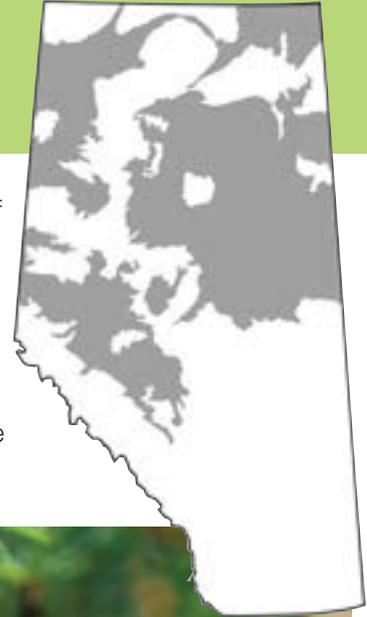


Photo by Britni Gray



Photo by Britni Gray

Common Blueberry

Vaccinium myrtilloides

tsáⁿlhchoth



Identification

Plants: The common blueberry is a low shrub, generally 10–40 cm in height, with leaves that have smooth edges. Leaves are thin, elliptical to lance-shaped, and they alternate along the stem. The leaves also have small hairs making them velvety to the touch. Young bark is pale greenish-brown with velvety white hairs covering the surface, but with age the bark becomes darker brown.

Flowers: The small flowers are green, white, and pink in colour and bell shaped. These flowers have 5 petals and appear in small clusters of 5–10 flowers at the ends of branches.

Fruits: The fruits of the common blueberry are round and edible. As the berry develops from the flowers they are white or pale green. Once they mature, the fruit turns deep blue or blackish.

Seeds: There are numerous small seeds present within each berry. These tiny seeds are brown, roughly egg shaped or conical and wrinkled or bubbly in appearance.

When to Collect

The flowers appear between May and July, and the fruit and seeds within are ready to be picked between late July and August.

Common Blueberry

Vaccinium myrtilloides
tsáⁿlhchoth

Where to find

Blueberry is a common Alberta boreal species that can grow in wet to dry areas, but these plants prefer acidic soils and full to moderate amounts of sunlight. The best conditions for blueberries occur in bogs, peatlands, other open wetlands, coniferous forests or sandy areas in openings or on hillsides. This species also grows in other areas of Canada, such as Saskatchewan, Ontario, Quebec, and Newfoundland. Blueberries often frequent disturbed areas.

How to Collect

The fruit can be picked by hand directly off the plant. They can be put into buckets, plastic bags, durable paper bags and almost anything else that can hold them for transport.

How to transport, clean, and store

The berries should be transported in cool temperatures, such as in a cooler with ice packs,

as this will help prevent the berries from rotting.

To remove the seeds from the berries, the fruit could be mashed in a food processor with blades thoroughly wrapped in tape to avoid damaging the seeds, or crushed by hand with the back of a spoon. The seeds can be separated from the pulp by adding the mixture to a bowl of water; seeds will settle to the bottom while the pulp and other material float to the surface. Seeds should be rinsed clean and air dried for 24 hours or until they are very dry. To avoid spoilage during long-term storage, store seeds within 3–8% moisture content (very dry).

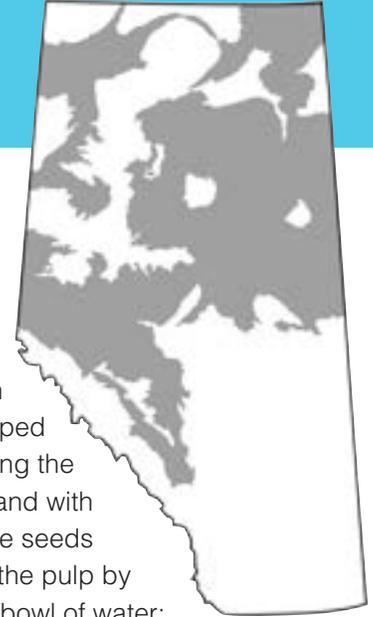


Photo by Andrea Wiebe



Photo by Andrea Wiebe

Common Bearberry, Kinnikinnick

Arctostaphylos uva-ursi
délhni, déni



Identification

Plants: This short evergreen shrub has dark-green, thick, leathery leaves that alternate along a trailing stem. The leaves are often rounded, elongate or spatula-shaped and smooth at the edges, with a network of veins on the underside. Horizontal woody stems with numerous upright branches allow leaves to form mats on the ground. Branches are white, green, or reddish when young, but turn brown or grey with age.

Flowers: The petals of each flower are fused together to form a round, bell-shaped tube with a lip at the bottom. Flowers are white, pink, or red with a ring of darker pink or red around the bottom lip. Clusters of 3–10 flowers are found at the ends of branches and droop downwards to give them a nodding appearance.

Fruits: The berry-like round fruits are bright red or pink, dry, and have a smooth and glossy shell-like skin. The fruits are not juicy and are generally tasteless but are edible.

Seeds: In the centre of each fruit, a round stone is split into 1–6 small sections similar to an orange. Each section holds 1 seed. The stone and its united seeds are yellow and turn to brown as they reach maturity.

When to collect

Flowers appear in late April through July, but bright red fruits are ripe and ready for picking in August and September. Mature seeds are released after fruits are ripe and during the winter months, but the fruit can also remain on the plant throughout the winter.

Common Bearberry, Kinnikinnick

Arctostaphylos uva-ursi
délhni, déni

Where to find

Bearberry can be found throughout the boreal region of Alberta, but it prefers coarse or sandy, dry, slightly acidic soils and only a small amount of shade. For this reason, it is mainly found in rocky or sandy areas in pine forests, mixed woods, along shorelines, prairies, or on hillsides. It is found throughout North America, including northern areas of Canada and the United States.

How to collect

The fruits of bearberry can be picked by hand when ripe. They can be put into buckets, paper bags and almost anything else that can hold them for transport.

How to transport, clean, and store

Fruits should be stored in a cooler with ice packs during transport. To remove the seeds from the fruit, the fruit could be mashed in a food processor with blades thoroughly wrapped in tape to avoid damaging the seeds, or crushed by hand with the back of a spoon. The seeds can be separated from the pulp by adding the mixture to

a bowl of water; seeds will settle to the bottom while the pulp and other material float to the surface. Seeds should be air dried for 24 hours at room temperature or until seed is very dry. To avoid spoilage during long-term storage, store seeds within 3–8% moisture content (very dry).



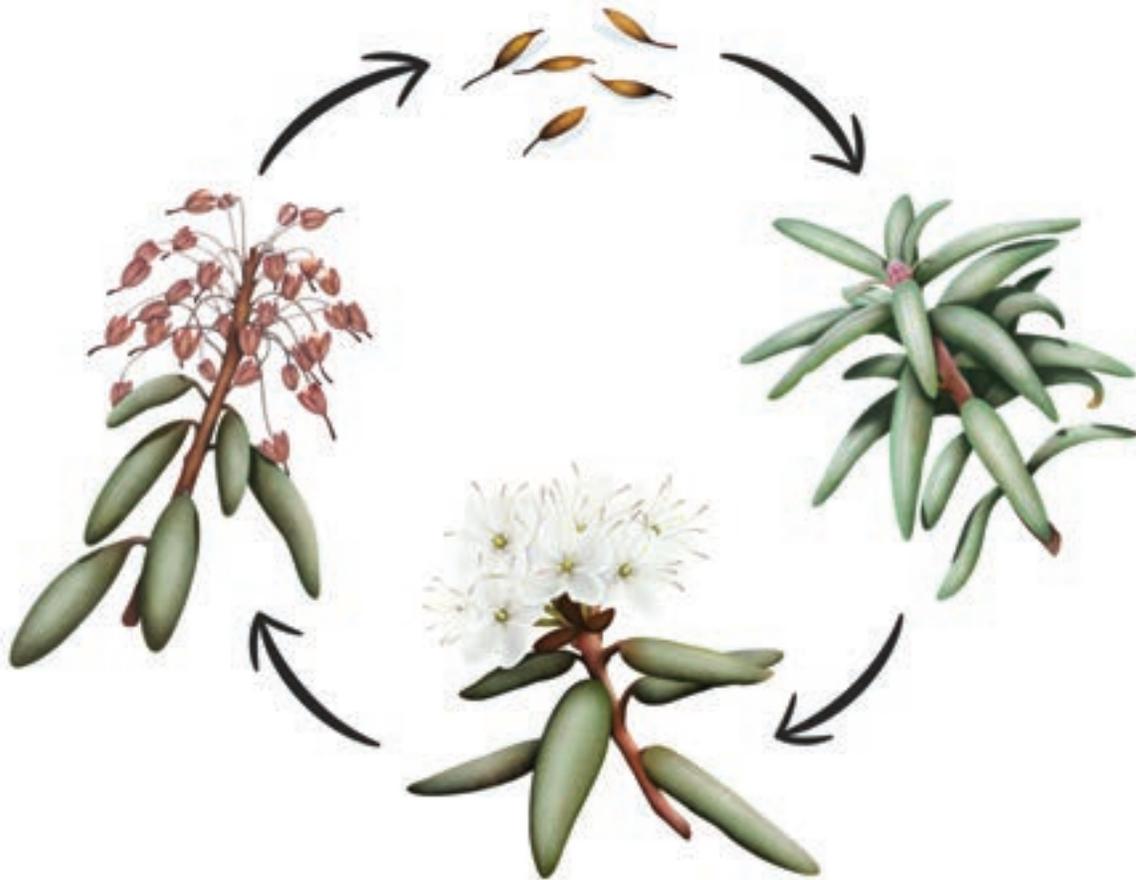
Photo by Andrea Wiebe



Photo by Britni Gray

Labrador Tea, Muskeg Tea

Rhododendron groenlandicum, *Ledum groenlandicum*
nágodhi, naghodhi, nagodhe



Identification

Plants: A short, upright herb that emits a distinct smell when the leaves are crushed. Leaves are dark green on top, thick, leathery, and oval to elliptical in shape. The underside of the leaves have distinctly woolly, rusty orange to brown hairs and the leaf edges curl downwards. Leaves alternate on the branches and remain green throughout the year. Bark of the Labrador tea is densely hairy, velvety, and orange, red or light brown.

Flowers: A sphere of 5–20 small white flowers can be found at the tip of each branch of the plant.

Each flower has five petals and numerous long white stamens extending from the centre.

Seeds: Seeds are encased in a hairy, brownish-green to pink oblong capsule. Each capsule has a long pink or red-orange spike extending from the tip. These capsules occur in clusters that replace the flowers and develop at the tip of the plant. The mature seed inside is tiny, needle shaped and light brown.

When to collect

Labrador tea flowers can be seen in May to mid-July and seeds are ready to be collected starting in August through to October.

Labrador Tea, Muskeg Tea

Rhododendron groenlandicum, *Ledum groenlandicum*
nágodhi, naghodhi, nagodhe

Where to find

Labrador tea is found in moist, acidic environments such as bogs, muskegs, swamps and wet coniferous forests in the northern boreal, sub-arctic, and arctic regions of Canada. It is also commonly found in the shaded, drier and highly acidic areas of pine and spruce forests throughout the region.

How to collect

Seeds can be collected by hand picking the entire seed capsule cluster off the tips of each plant into a bucket or paper bags. Leaves and stems should be avoided for a clean collection.

How to transport, clean, and store

Seed capsules should be stored in a cooler with ice packs during transport. The seed capsules can be spread onto a tray at room temperature to encourage capsules to open up and release seeds. Some agitation, such as gently rubbing

capsules together in a cloth bag, can help remove the outer capsule layer. The seed capsules can be easily separated from other materials by using a variety of different sieve sizes. To avoid spoilage during long-term storage, store seeds within 3–8% moisture content (very dry).

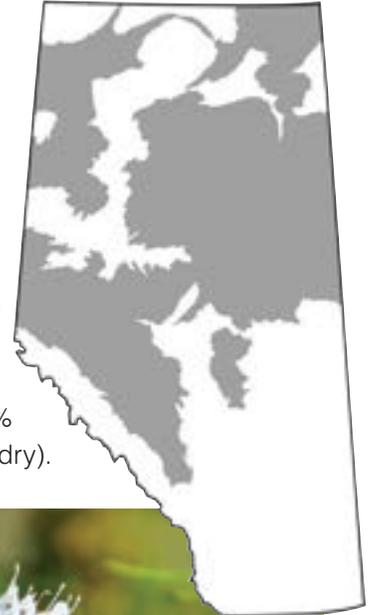


Photo by Britni Gray



Photo by Britni Gray

Wild Mint, Field Mint

Mentha arvensis

tsá tlh'ogh tsënë



Identification

Plants: Upright herb, 10–50 cm tall, with hairy, square stems. When young, stems can be pale greenish-purple in colour. Leaves have toothed edges and are lance to egg shaped with a pointed tip. Veins are prominent on both the upper and lower side of each leaf, the underside being hairy and covered in glandular dots. Leaves are in pairs of two along the stem, opposite each other. The direction each pair of leaves faces alternates along the stem. A minty scent is given off when leaves are crushed.

Flowers: Small white, pale purple or pink bell-shaped flowers are present in whorled clusters along the stem at the base of each set of leaves.

Each flower has four lobes, with the larger top lobe being split into two parts. Each flower has four stamens.

Seeds: Each flower matures into a dark green or brown capsule containing four small brown, oval shaped capsules. These capsules have a hard exterior and each contain a single seed and are found in clusters along the stem at the base of each set of leaves where flowers were previously present.

When to collect

Wild mint flowers occur from June to August, and seed capsules can be collected anytime between June to late August.

Wild Mint, Field Mint

Mentha arvensis

tsá tlh'ogh tsënë

Where to find

This plant can be found in wet or moist areas, such as lowlands, sloughs, river banks, lakeshores and the edges of wetlands. It thrives in areas with full sun or light shade. It can be found in fine to medium textured and neutral to slightly acidic soils. This species has a wide geographical range.

How to collect

The seeds of wild mint can be collected by hand. This is done by picking the stems with seed capsules attached. For a cleaner collection, the clusters of seeds can easily be picked off a stem and put into a bucket or paper bag.

How to transport, clean, and store

Seeds should be stored in a cooler with ice packs during transport. The seed capsules can be easily separated from other materials by using a variety of different sieve sizes. To avoid spoilage during

long-term storage, store seeds within 3–8% moisture content (very dry).



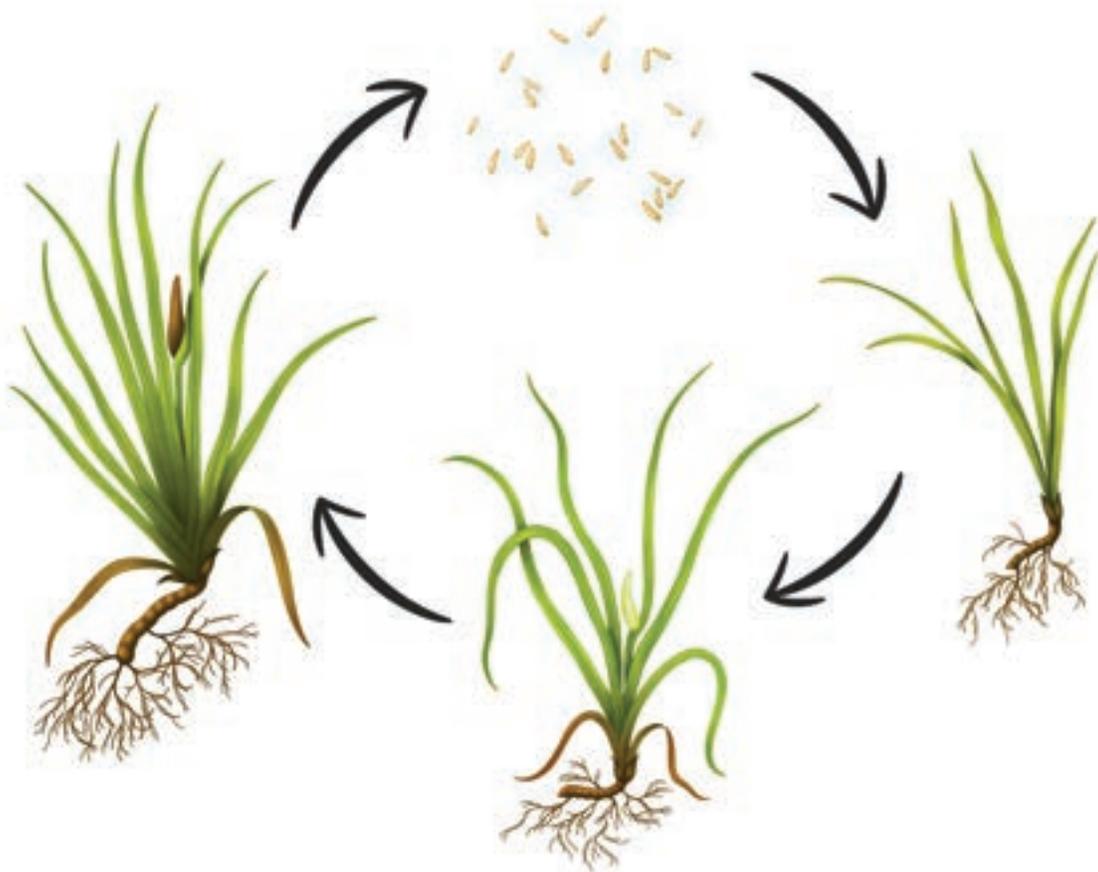
Photo by Britni Gray

Photo by Britni Gray

Rat Root, Sweetflag, Calamus

Acorus americanus

dzën ni



Identification

Plants: This aquatic, upright herb has distinctly sweet smelling roots. The stem is flat and leaf-like with alternating leaves attached to the base of the plant. Leaves are bright green, long, flat, and grass-like in appearance with prominent veins. A spike-like structure of flowers, also called a spadix, branches out from the middle of the leaf-like stem.

Flowers: On the fleshy, spike-like spadix, there are numerous tiny, yellow, green or brown flowers. Each flower has 6 small, scale-like petals and appear in a diamond-shaped pattern along the spadix.

Fruit: The fruits are a hard, dry, red-brown berry with a jelly-like substance inside encasing 6 small seeds.

Seeds: The seeds are small, brown to cream-coloured at maturity, and roughly elliptical with convex sides. The seeds spread by water.

When to collect

In Alberta, flowers bloom in July to August and seeds are ready for collection in late September to early October. Elsewhere, seeds are ready in late summer.

Rat Root, Sweetflag, Calamus

Acorus americanus

dzën ni

Where to find

Rat root is an aquatic species found in areas with seasonal, shallow standing water and poorly drained soils. This species does not tolerate dry or highly acidic or basic soils. Areas that host rat root include marshes, bogs, swamps and the banks of streams. Rat root can be found in the boreal forest region of northern Alberta and is widely distributed across much of Canada and the United States.

How to collect

The spike-like spadix can be handpicked or clipped from the plant.

How to transport, clean, and store

The spadix should be stored in a cooler with ice packs during transport. The fruit can be rubbed off the spadix, and then seeds should be separated from other fruit material. This may be done by mashing seeds and additional water in a

food processor with blades thoroughly wrapped in tape to avoid damaging the seed, or crushed by hand with the back of a spoon. The seeds and pulp can be mixed with water to separate the denser seed from the other floating matter. The seeds should be rinsed clean and air dried for 24 hours before long-term storage. To avoid spoilage during long-term storage, store seeds within 3–8% moisture content (very dry).



Photo by Andrea Wiebe



Photo by Andrea Wiebe

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About the Authors



Andrea Wiebe (left) and Britni Gray (right) wearing women's traditional ribbon skirts gifted to each SINEWS participant. These garments were made by the SINEWS team and Elder Heather Poitras. Photo by Cindy Shaw.

Andrea Wiebe grew up on Treaty 6 territory and graduated from the University of Alberta with a BSc. in Environmental and Conservation Sciences majoring in Human Dimensions of Environmental Management. Through her involvement in the SINEWS project, she has developed a renewed appreciation for the contributions that both Indigenous and scientific knowledge can offer toward effective stewardship of the land.

Britni Gray is currently in her 4th and final year of her undergraduate degree at the University of Alberta. There, she is earning a BSc. in Environmental and Conservation Sciences, Major in Conservation Biology. Her focus is largely on wildlife ecology and zoology, but also has a deep passion for botany and taxonomy. She aims to pursue both an MSc. and PhD in Wildlife Ecology from the University of Alberta in the future. As a Métis woman, Britni valued her experience with the SINEWS program as she was given the opportunity to connect with herself on a cultural level. She truly values the steps the SINEWS program has taken towards reconciliation.



Sistering Indigenous and Western Science