

## Alpine Bilberry (*Vaccinium uliginosum* var. *alpinum*)

### How to identify

- **Deciduous.**
- Low shrub - from an inch tall in exposed areas, to just over a foot in more protected areas.
- **Leaves emerge slightly before the flowers.**
- **Leaves are nearly circular**, (round at the tip, narrowing towards the base), waxless, and have a subtle deep blue-green hue, which becomes purple or red in the fall.
- **Flowers emerge along the stem** in groups of 1-3.
- White to pale pink bell-shaped flowers hang beneath the emerging leaves.
- Petals are fused, and will drop as a unit before the fruit begins to develop.
- Mature fruits look like dark blueberries.



Figure 1. Alpine bilberry in full flower.

**Look alike plants** – Although it is possible to confuse this shrub with other blueberries, bilberries, or cranberries found above treeline, a careful look at the leaves will distinguish this species. Alpine bilberry's **round leaves** are nearly unique among this group. All other related species have leaves that come to a tip, except mountain cranberry, whose leaves are evergreen with a waxy coating and a prominent mid-vein (looks like a coffee bean). Flower buds of blueberries emerge in groups of 2-5 from the tip of the stem at the same time as the leaves, while bilberry flowers emerge **in groups of 1-3 from along the stem** after the leaves begin to emerge. Without leaves or flowers, this species is difficult to identify. Look for last year's leaves that sometimes persist on the stem or have fallen to the ground nearby for clues.

**Phenology** – Blooms mid- to late-June.

**Growth strategy and form** – Perennial deciduous dwarf shrub.

**Habitat** - Generalist. Found throughout the alpine zone where environmental conditions are moderate.

**Natural history notes** – The fruits are edible, although not quite as sweet as blueberries.

**Special adaptations and features** – Like many in the heath family, alpine bilberry is well adapted to survive in the nutrient poor soils found in the alpine zone. In northern latitudes, it is called “bog bilberry” and is found in low elevation bogs, where limited nutrients are made unavailable because of soil acidity.

**Taxonomy** – Heath family (Ericaceae) - Alpine bilberry is closely related to the dwarf bilberry (*Vaccinium cespitosum*), which is found almost exclusively within alpine snowbank communities. It is also in the same genus as the various blueberry and cranberry shrubs found above treeline. It is more distantly related to, but still in the heath family with, Lapland rosebay, alpine azalea, Labrador tea, and many other alpine sub-shrubs.

**Distribution** – Regionally, this species is found in NY, VT, NH, ME, and Canada. It has a circumboreal distribution, which means it can be found in boreal regions around the world (figure 2).

**Conservation status** – Although this alpine bilberry can be common at locations where it is found, overall it is rare in our region. It is on a state watch list in NY, and a species of special concern in ME. It becomes common further north and is globally secure.

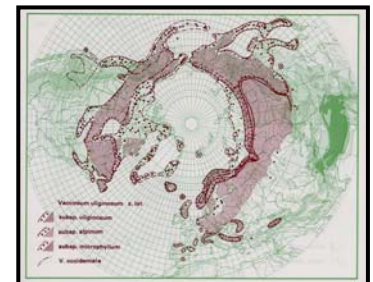
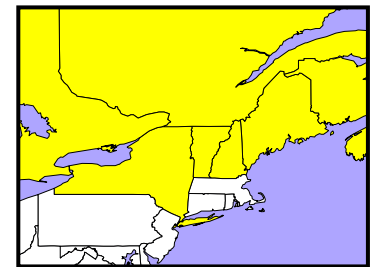


Figure 2. Regional (upper) and global (lower) distribution of alpine bilberry.

## CHECK ALL PHASES THAT APPLY ON DATA SHEET

### Phenology stages for Alpine Bilberry

**Vegetative condition** – Record this phase until the flower buds begin to swell. Carefully look for swelling of the flower buds along the stem. It may be hard to distinguish between a flower bud and a leaf bud, but the leaf buds begin to swell and open just before the flower buds (blue arrow in figure 3). Although the flower buds can be located anywhere along the stem, they will tend to have more of a pinkish-red hue (white arrows in figure 3) as opposed to the whitish-green leaf buds.

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Figure 3. Flower buds in vegetative condition (white arrows). Leaf buds are already open and leaves are emerging (blue arrow).

**Flower buds swelling or flowers emerging** – Record this phase as soon as the flower buds begin to swell; this phase is complete once all flower buds have opened. Look for small red or pink flower buds along the stem, as they begin to swell. The flower buds emerge after the leaf buds. The flower buds will have a pinkish-red hue. Once the leaves fully emerge, you may need to carefully lift the stem and look beneath the leaves to determine when the flowers first open (figure 4).

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Figure 4. Flowers emerging and about to bloom.

**Flowering** – Record this phase as soon as a flower has opened; this phase is complete when all of the petals have fallen. The delicate pale pink bell-shaped flowers hang down from the twigs (figure 5). Because of this, it can be difficult to see when the flowers are actually open. Carefully tilt the flower buds up towards you to determine if there is any open space between the petals at the tip of the bell indicating that flowering has begun.

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Figure 5. In full flower.

**Flowers shedding** – Record this phase as soon the petals begin to fall; this phase is complete once all of the petals have fallen. The petals of the bilberry flower are fused together, so all petals of a flower are shed at once. However, not all flowers will be shed at once; they will drop over a number of days. As the petal tubes fall, they will reveal a green ovary that will develop into the fruit (no picture).

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**Fruits present** – Record this phase as soon as the green ovaries begin to swell; this phase is complete when all fruits have fallen from the stem.

Determining when the fruit has begun to develop can be difficult. Once the petal tube has fallen, there will be a small green ovary. Look for changes in color or swelling in comparison to others nearby. Not all ovaries will develop, as some flowers will not be fertilized and will neither swell nor form fruits. Make sure to look beneath leaves for developing or mature fruits. The green fruits will eventually turn purple and then blue as the season progresses (figure 6).

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Figure 6. Maturing (green) and ripe (blue) bilberry fruits.

**Seeds dispersing** – Record this phase as soon as the ripe blue berries begin to fall from the stem. Look for them on the ground near the plant soon after the berries mature (no picture).

## **Bigelow's Sedge** (*Carex bigelowii*)

### How to identify

- Grows from a creeping underground rootstock.
- **Does not form large tufts** like other common sedges.
- Leaves emerge together in small bunches from rootstock.
- New leaves from this season are entirely green and usually emerge from the center of a clump of older dried leaves.
- **Leaf blades are narrow** ( $\frac{1}{4}$  the width of your pinky nail), but relatively wide compared to most alpine grass-like plants.
- Flowers are borne on a **thin triangular stalk**, which emerges after the leaves and eventually grows to be taller than the leaf blades (usually 6-12 inches).
- Flower stalk usually carries **1 (sometimes more) male spike at the top, and 2 (or more) female spikes below**.
- **Erect flower spikes are cylindrical**; the female spike is a bit stouter than the male.
- Each spike is covered in **dark purplish to black scales**.
- Male spike produces highly visible **cream-colored anthers** (male flower part – figure 1) and the female spike has more subtle **white stigmas** (pink arrow, figure 6).
- As the fruits develop, the edge of the green seeds will emerge slightly from behind the dark scales (figure 7).



Figure 1. Bigelow's sedge in full flower. The cream-colored anthers are visible extending from the male flower spikes.

**Look alike plants** – At a distance, many of the graminoids (grass-like plants) look similar. However, with a closer look, this species can be distinguished from other common sedges, grasses, and rushes found above treeline. The **dark scales** of the **cylindrical spikes** are the best indicators of this species. Other dark-scaled graminoids, such as scirpus-like sedge, black sedge, and spiked woodrush, have spikes that are borne singly or are drooping rather than erect. Most alpine graminoids have very narrow leaves; Bigelow's sedge leaves are relatively wide.

**Phenology** – Blooms in late-May to late-June.

**Growth strategy and form** – Perennial rhizomatous graminoid.

**Habitat** – Bigelow's sedge is most common at higher elevations. It generally grows in flat areas that drain poorly or other areas with moist soils (figure 2).

**Natural history notes** – Each year, new shoots grow from different sections of the underground rhizome (root-like structure). They will produce leaves for a few years, flower, and then die. A new shoot will have no dead leaves from last year, while a 1-year old shoot will have just a few.



Figure 2. Typical sedge meadow habitat.

**Taxonomy** – Although many assume that this species is a grass, it is actually a member of the sedge family (Cyperaceae). The taxonomy of the Bigelow's sedge group worldwide is not fully understood at present. With additional information and genetic analysis, the species may be split into a few different species, or at least varieties, in the future.

**Distribution** – Regionally found in NY, VT, NH, ME, and Canada. It is also found in the Rocky Mountains, and polar regions throughout the world (figure 3).

**Conservation status** – Bigelow's sedge is globally secure, but becomes rare at the southern edge of its range. It is a species of special concern in ME and VT, and threatened in NH and NY.

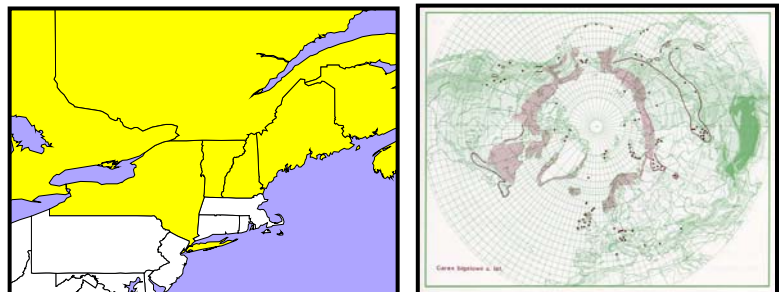


Figure 3. Regional (left) and global (right) distribution of Bigelow's sedge.

CHECK ALL PHASES THAT APPLY ON DATA SHEET

**Phenology phases for Bigelow’s Sedge**

**Vegetative condition** – Record this phase until a flower stalk with dark flower spikes begins to emerge from the ground. The brown papery leaf blades from last year will indicate plant locations and where this year’s new green growth will come from (figure 4). The leaves will emerge just before the flower stalk. Search carefully to make certain there are no flower stalks beginning to emerge from the center of the new leaf blades.



Figure 4. New leaf blades emerging. No flower stalks are evident yet.

**Flower stalks growing or flower spikes emerging** – Record this phase as soon as the flower stalks and dark flower spikes begin to emerge from the ground; this phase is complete once all flower spikes have begun to flower. The flower stalk will emerge from the center of the shoot, where new leaf growth has begun. The flower stalk can be differentiated from the leaves; the stalk is triangular rather than flat and will have 2-5 dark cone shaped flower spikes at its tip (figure 5). As the flower stalk continues to grow up, the flower spikes will swell.



Figure 5. A growing flower stalk with dark flower spike at the tip.

**Flowering** – Record this phase as soon as the spikes loosen and any of the flower parts (stigmas or anthers) appear; this phase is complete when all of these parts have wilted or disappeared. As the flower stalk grows you will see the male structures emerge first and the female slightly afterwards. The male spike(s) are thin, at the tip of the stalk, and put forth cream-colored anthers (blue arrow in figure 6). The female spike(s) are stouter, located below the male spike, and put forth faint white stigmas (pink arrow in figure 6).

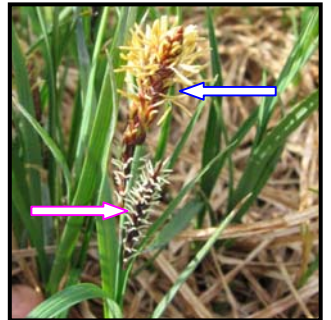


Figure 6. Bigelow's sedge in flower. A male spike (blue arrow) is located at the top of the stalk and a female spike (pink arrow) is beneath and in front of it.

**Flower shedding** – This phase cannot be easily observed and will not be recorded for this species. Once the flowering parts have wilted, assume that the fruit is present and beginning to develop, and go directly to the next phase.

**Fruits present** – Record this phase as soon as the female flowering parts (white stigmas) have wilted or disappeared; this phase is complete when all of the achenes (a hard seed-like fruit of a sedge) have dropped from the female spike. Once the flower parts have shed, the achenes will begin to develop and mature on the female spikes. The achenes are difficult to see initially, but as the fruit develops, it will become visible as a green round structure located behind a single dark scale (figure 7). The achene will harden and begin to turn brown before it disperses.



Figure 7. Seeds developing on two female spikes below, and a male spike at the tip.

**Seeds dispersing** – Record this phase as soon as the achenes begin to fall from the female spike. The spike will slowly enlarge and dry out as it matures. Eventually, individual seeds will come loose from the spike and blow away. Look for holes in the spike where the achenes have separated from the female spike (no picture).

## Mountain Avens *Geum peckii*

### How to identify

- Leaf and flower stems emerge directly from the ground.
- **Large**, shiny, herbaceous leaves (figure 1).
- Leaf shape is **round to kidney-shaped, with shallow lobes** (figure 2).
- Margin of leaf is serrated (saw-toothed).
- **Tiny leaves grow along the leaf stem.**
- Separate flower stems carry 1-5 **large yellow buttercup-like flowers** above the leaves.
- Each flower has 5 unfused petals (figure 1) and can produce about 50 seeds.
- Seeds are tear-shaped with an awn at the tip, and covered in long hairs (figure 8).
- Leaves turn bright red to deep purple in the fall.

**Look alike plants** – When mountain avens is in flower, the **large yellow flowers on long stems** make it difficult to confuse this plant with anything else above treeline. The large leaves are also quite distinct for an alpine plant. Purple avens (*Geum rivale*) has a similar looking leaf, but it is only found below treeline. Cloudberry (*Rubus chamaemorus*) also has a similar leaf, but it is more deeply lobed than the leaves of mountain avens. Although the leaves of various currant species (*Ribes* spp.) are also similar, currants are shrubs and the leaves are borne on woody stems.

**Phenology** – Blooms mid- to late-June.

**Growth strategy and form** - Perennial herbaceous forb.

**Habitat** – Mountain avens are found in all types of moist to wet alpine areas, including wet meadows, streams, bogs, depressions, and cliff seeps. It is also found at some lower elevations along cool subalpine streams, such as at Zealand Falls.

**Natural history notes** – There is a closely related Appalachian avens (*Geum radiatum*), which is limited to 10 populations in the southern Appalachian Mountains.

**Taxonomy** – Mountain avens is a member of the rose family (Rosaceae). It is closely related to the blackberry/raspberry genus (*Rubus*), but does not produce edible fruits.

**Distribution** – Mountain avens is limited to only a few disjunct locations worldwide. It is only found in the White Mountains of NH, and Digby County in Nova Scotia (figure 3). Despite the fact that the species is rare globally, it is common in wet alpine areas throughout the White Mountains.

**Conservation status** – Because it is found in so few locations worldwide, conservation in these areas is critical. It is considered threatened in NH, and federally endangered in Canada.



Figure 1. Mountain avens in flower.

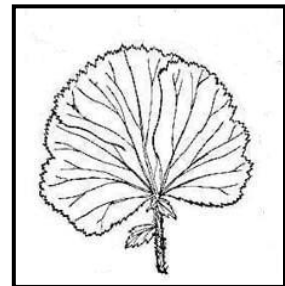


Figure 2. Mountain avens leaf

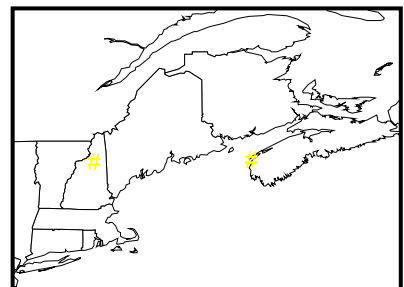


Figure 3. Global distribution of mountain avens.

## CHECK ALL PHASES THAT APPLY ON DATA SHEET

### Phenology phases for Mountain Avens

**Vegetative condition** – Record this phase until the first flower stalk and flower bud emerge from the center of a plant. Look for this year's emerging leaves (red arrows in figure 4) and last year's flower stalks (blue arrows in figure 4) as a location indicator. The leaves will begin to emerge and expand just before the flower stalks emerge. Until they unfold, the flower stalk looks similar to an emerging leaf. Look for a large flower bud enclosed by smaller leaves at the top of a stalk to distinguish flower stalks from leaves.

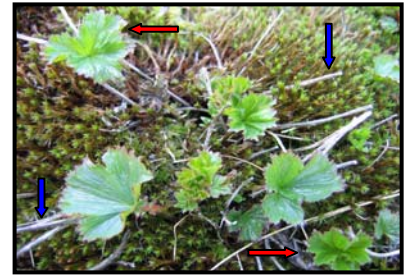


Figure 4. Last year's flower stalks (blue arrows) and newly emerging leaves (red arrows).

**Flower stalks growing or flowers emerging** – Record this phase as soon as the flower stalks and flower buds begin to emerge; this phase is complete once all flower buds have opened. The leaves will begin to emerge and expand just before the flower stalks emerge. The flower stalk is separate from the leaves (red arrows in figure 5). The flower buds will be enclosed by green sepals (small leaves). As the stalk continues to grow, the flower bud will expand and begin to open.



Figure 5. Emerging flower stalks (red arrows).

**Flowering** – Record this phase as soon as a flower has opened; this phase is complete when all of the petals have fallen. Flowers are open when the yellow petals are open enough to allow access to a pollinator (figure 6).



Figure 6. Fully open mountain avens flower.

**Flowers shedding** – Record this phase as soon the petals begin to fall; this phase is complete once all of the petals have fallen. The petals of the mountain avens will fall individually, but not necessarily at the same time. The many yellow anthers and stigmas (male and female reproductive parts), and 5 green-yellow sepals (small leaves) will remain (red arrows in figure 7).

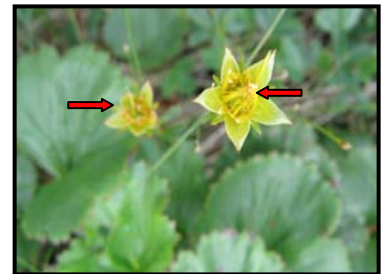


Figure 7. All petals shed; sepals remain.

**Fruits present** – Record this phase as soon as the green ovaries begin to swell; this phase is complete when all fruits have fallen from the stem. Determining when the ovary has begun to develop can be difficult. As the petals drop, the anthers and stigmas will begin to wither and the green ovaries beneath the stigmas will begin to swell slightly. Look for changes in color or swelling in comparison to others nearby. As they mature, the fruits will develop hairy bristles, harden, and turn brownish (figure 8).

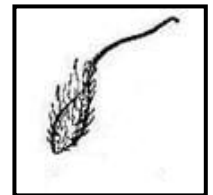


Figure 8. An individual mature seed.

**Seeds dispersing** – Record this phase as soon as the mature fruits begin to drop from the flower heads. Up to 50 hardened fruits with small bristles can form in an individual flower. Look carefully to see if any of the mature fruits are missing from the flower head (no photo).

## Diapensia (*Diapensia lapponica* var. *lapponica*)

### How to identify

- Forms **low growing** mats - 2 inches or less (figure 1).
- Leaves are **evergreen** and slightly waxy.
- **Tiny leaves, form tight rosettes** that usually surround a flower or leaf bud.
- Leaves have a purple-red tint throughout the non-growing season.
- Flowers are large in comparison to the leaves.
- 5 **white fused petals** extend on stalk above the mat.
- Fruit eventually dries and forms a capsule that splits open to allow seed dispersal.

**Look alike plants** – When not in flower, this species could be confused with an associated cushion plant alpine azalea (*Loiseleuria procumbens*), which also has tiny leaves that form low cushion mats. In a vegetative state, a mat of alpine azalea can be distinguished by its looser leaves, which do not form the characteristic tight rosettes of diapensia (see figure 3). As soon as the flower buds break, these two can be easily distinguished by the pink petals of alpine azalea (although there is a white version in other regions).

**Phenology** – Flowers in late-May to mid-June. Diapensia is **one of the first alpine plants to bloom**. It will occasionally bloom again in August.

**Growth strategy and form** - Perennial mat-forming evergreen sub-shrub.

**Habitat** – Within the alpine zone, diapensia generally grows at higher elevations and in exposed areas. It is often associated with other cushion and sub-shrub plants such as alpine azalea (*Loiseleuria procumbens*), Lapland rosebay (*Rhododendron lapponicum*), alpine bilberry (*Vaccinium uliginosum*), and bearberry willow (*Salix uva-ursi*).

**Natural history notes** – There is a rare form of diapensia with numerous petals instead of the normal 5 petals. Its distribution, natural history, and phenology are largely unknown, although it does flower later than the typical diapensia. If you come across one of these plants, make a note of its location. Although diapensia is very resilient, it grows extremely slowly and is therefore slow to recover from impacts.

**Special adaptations and features** – This plant is especially well adapted to exposed areas and extreme conditions. Its low growth form of tight cushions helps to reduce heat and water loss from wind, and physical damage from blowing snow and ice. The waxy leaves also help to retain water. Early in the season, the leaves have a purple-red color. This pigment (anthocyanin) absorbs potentially harmful ultraviolet radiation and converts it into heat.

**Taxonomy** – Diapensia family (Diapensiaceae) – In New England, there are no other species in the *Diapensia* genus and only one other in the family. It is closely related to the heath family (Ericaceae).

**Distribution** – Regionally, diapensia is found in alpine areas of NY, VT, NH, ME, and Canada. It is also found throughout boreal and arctic regions of the world including Greenland, and northern Europe. A different variety (var. *obovata*) is found in northern Asia, northwest Canada, and Alaska (figure 2).

**Conservation status** – Although diapensia can be locally common in alpine areas, it is rare overall in the region. It is listed as state endangered in VT, threatened in NY and NH, and a species of special concern in ME. It becomes common further north and is globally secure.



Figure 1. Diapensia mat in partial bloom.

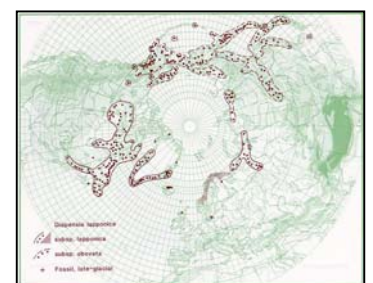
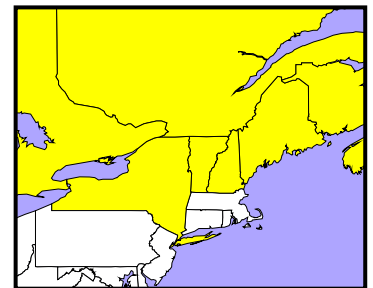


Figure 2. Regional (upper) and global (lower) distribution of Diapensia.

## CHECK ALL PHASES THAT APPLY ON DATA SHEET

### Phenology phases for *Diapensia*

**Vegetative condition** – Record this phase until the flower buds begin to swell.

Carefully look at the small buds at the center of the tiny leaf rosettes for swelling. The flower bud near the lower right corner in figure 3 has not begun to swell, while the bud in the upper left corner has just begun.

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Figure 3. Swelling flower buds will emerge from center of leaf rosettes (yellow arrows).

**Flower buds swelling or flowers emerging** – Record this phase as soon as the flower buds begin to swell; this phase is complete once all flower buds have opened. Flower and leaf buds are located at the center of the tiny leaf rosettes (yellow arrows in figures 3 and 4). Flower buds will have a whitish color before they begin to emerge. Individual flower buds begin to grow up above the mat on a stalk. Soon, the flower begins to emerge, and unfolding white petals can be seen (flower buds towards the edges of figure 5).

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Figure 4. Swelling flower buds.

**Flowering** – Record this phase as soon as any of the flower buds have opened; this phase is complete once all petals have fallen. The white flowers are fully open when the yellow anthers (male reproductive part) are visible and the petals are open enough to allow access to a potential pollinator; a small fly or bee (open flowers in the center of figure 5).

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Figure 5. Flowers emerging (corners) and in full flower (center).

**Flowers shedding** – Record this phase as soon as the petals begin to fall; this phase is complete once all petals have fallen. The yellow anthers will usually turn brown and begin to wither right before the flower sheds. The petals are fused and form a flower tube, which falls from the flower stalk as a single unit (right side of figure 6). The flower tube will fall leaving a green ovary enclosed by a greenish-red sepal tube.

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Figure 6. Flower tubes beginning to shed.

**Fruits present** – Record this phase as soon as the ovaries begin to develop; this phase is complete when all fruits have split open. Determining when the fruit begins to develop can be difficult because the sepals (small persistent leaves directly below the petals) hide the developing ovary (figure 7). Once the petal tube has fallen, lightly pry apart the sepals and look for swelling of the green ovary. Not all ovaries will develop, as some flowers will not be fertilized and will neither swell nor form fruits. The developing fruit capsules will turn brown, and harden as the season progresses.

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Figure 7. Developing fruit capsules.

**Seeds dispersing** – Record this phase as soon as a fruit capsule splits open (dehisces) and seeds disperse. The fruit capsules dry as they mature. Eventually, the hardened brown capsule splits open at the top (figure 8) and the seeds disperse short distances during high winds or heavy rains. Like the phase before this one, determining when seed is dispersing can be difficult. Look closely at the capsules to see whether they have split open.

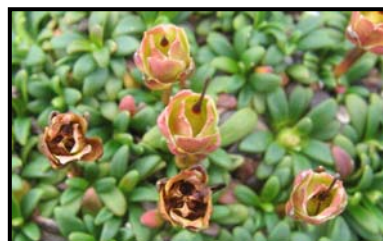


Figure 8. Fruit capsules nearing maturity (upper right), and mature with capsules split open (lower left).

## Mountain Cranberry (*Vaccinium vitis-idaea* ssp. *minus*)

### How to identify

- **Evergreen.**
- Sub-shrub; rarely exceeds **a few inches in height.**
- **Leaf is round (including the tip), has a prominent mid-vein, is waxy,** and relatively thick. Suggestive of a green coffee bean (figure 1).
- Light pink **bell-shaped flowers** grow in drooping clusters from the tip of the stem.
- The petals are fused, and will drop as a unit before the fruit begins to develop.
- Mature fruits are vibrant **red berries** (figure 2).

**Look alike plants** – There are a number of plants that are similar to mountain cranberry in one or two attributes, but the combination of the **low-growth form, round waxy leaves,** and **pink bell-shaped flowers** or **red berries** are unique to this plant.

**Phenology** – Blooms mid-June to mid-July.

**Growth strategy and form** - Perennial evergreen sub-shrub.

**Habitat** – Mountain cranberry is a generalist, and is found throughout the alpine zone where environmental conditions are moderate. It is also found in some low-elevation bogs and acidic forests.

**Natural history notes** – The fruits are edible, although they are extremely tart until they have been exposed to freezing cold temperatures. In northern Europe, they are known as lingonberries, and are commonly made into a jam.

**Special adaptations and features** – The waxy leaves of the mountain cranberry helps to retain moisture in the leaves. Despite the fact that alpine areas receive heavy amounts of precipitation, thin soils, and exposure to sun and high winds can create drought conditions for alpine plants. The leaves are also evergreen, which allows the plant to begin photosynthesis as soon as the short growing season begins.

**Taxonomy** – Heath family (Ericaceae) – Mountain cranberry is in the same genus as the various blueberry and bilberry shrubs found above treeline. It is more distantly related to, but still in the heath family with, Lapland rosebay, alpine azalea, Labrador tea, and many other alpine sub-shrubs.

**Distribution** – Regionally found in ME, NH, VT, MA, CT, and Canada. It is also found in MI, WI, MN, and boreal regions throughout the world (figure 3).

**Conservation status** – Mountain cranberry is regionally and globally secure. It becomes rare at the southern end of its range, and is considered endangered in MA, and a species of special concern in CT.



Figure 1. Mountain cranberry in flower.



Figure 2. Mountain cranberry in fruit.

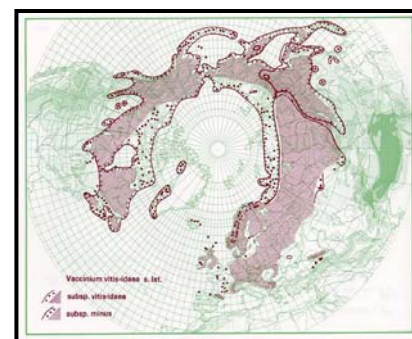
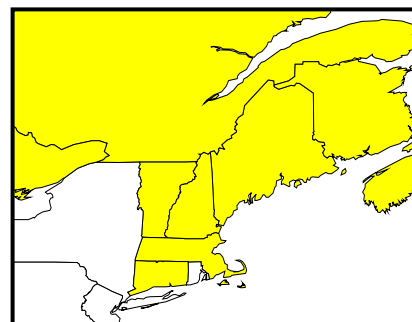


Figure 3. Regional (upper) and global (lower) distribution of mountain cranberry.

## CHECK ALL PHASES THAT APPLY ON DATA SHEET

### Phenology phases for Mountain Cranberry

**Vegetative condition** – Record this phase until the flower buds begin to swell. Carefully look at the tiny buds at the tip of the stem to make sure they have not begun to swell; they will turn from minute brown buds to tiny red buds as soon as they begin to swell (figure 4).

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Figure 4. Reddish-brown flower bud just beginning to swell.

**Flower buds swelling or flowers emerging** – Record this phase as soon as the flower buds begin to swell; this phase is complete when all flower buds have opened. Look for the small red-pink buds on the tip of the stem as they begin to swell. It may be hard to distinguish between a flower bud and a leaf bud. The flower buds are at the tip of the stem (leaf buds can be at the tip or along the stem), will look red or pinkish (figure 5), and are rounder and slightly larger than the leaf buds. As the flowers emerge, the color will lighten to a pale pink. Because the flowers droop, you will need to look beneath the flower buds to know when the flowers open.

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Figure 5. Pinkish flower buds beginning to emerge.

**Flowering** – Record this phase as soon as any of the flower buds have opened; this phase is complete once all flowers have fallen. The delicate bell-shaped pink-white flowers hang down from the tip of the stem, making it difficult to see when the buds are actually open. You may have to carefully tilt the buds up towards you to determine if there is any open space between the petals at the tip of the bell (figure 6).

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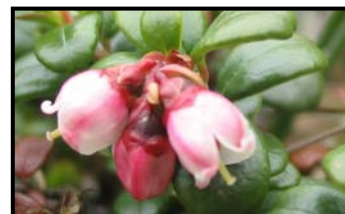


Figure 6. Bell-shaped flowers beginning to open. The central flower bud has not yet opened.

**Flowers shedding** – Record this phase as soon as the petals begin to fall; this phase is complete once all petals have fallen. Mountain cranberry petals are fused, so the entire flower tube is shed at once, leaving a single small red-green ovary (arrow in figure 7). The flower tubes will not shed all at once, but will drop over a number of days.

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Figure 7. Flowers beginning to shed.

**Fruits present** – Record this phase as soon as the ovaries begin to swell; this phase is complete when all fruits have fallen from the stem. Determining when the ovary has begun to develop can be difficult. Once the petal tube has fallen, there will be a small red and green ovary surrounded by a crown of sepals (tiny leaves) (figure 8). As the ovary begins to swell, the sepals will shrink, and the red color will deepen. Look for changes in color or swelling in comparison to others nearby. Not all ovaries will develop, as some flowers will not be fertilized. The fruits will continue to swell and become bright red as the season progresses.

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Figure 8. Maturing fruits. Sepals are located at the bottom of each fruit.

**Seeds dispersing** – Record this phase as soon as the ripe red berries begin to fall from the stem. Look for them on the ground near the plant soon after the berries mature (no picture).

## Labrador Tea (*Ledum groenlandicum*)

### How to identify

- **Evergreen** shrub.
- Generally a foot tall, but can be shorter in exposed areas and taller in protected areas (figure 1).
- Leaves are long and narrow, leathery, and are **rolled under at the margins**.
- **Underside of leaf is covered with brown fuzz** (figure 2).
- **White flowers** emerge from the tip of twig and **grow in a round cluster** (figure 3).
- Each flower has 5 petals with protruding stamens (figure 6 & 7).
- Drooping immature fruits are green, becoming reddish (figure 8), then brown as they mature and dry (figure 9).

**Look alike plants** – The 3 species that you might confuse this with are sheep laurel, bog laurel, or rhodora. All can be found growing together, but are easily distinguished by their leaves or flowers. None of these species has the characteristic **fuzzy brown underside, margins that roll under, or leathery surface** of the Labrador tea leaf. The flowers of sheep laurel and bog laurel are pink, and rhodora are purple, and neither form a distinct **ball of white flowers** like Labrador tea.

**Phenology** – Flowers in late June to early July.

**Growth strategy and form** – Perennial evergreen shrub.

**Habitat** – Prefers wet or boggy locations, but can be found in drier areas as well. Found at lower elevations within the alpine zone. Can also be found in bogs below treeline.

**Natural history notes** – This species of Labrador tea is not found in Labrador (but see notes under “Distribution”). The leaves are dried and used as a tea, which reportedly doesn’t taste very good, but has many medicinal uses.

**Special adaptations and features** – The fuzz on the underside of the leaves is believed to be an adaptation to retain moisture. The brown hairs comb moisture from ground fog, and act like a sponge to retain this water.

**Taxonomy** – Heath family (Ericaceae) – It’s not too surprising that Labrador tea is most similar in appearance to bog laurel and rhodora, as they are all in the same family. This is the same family as the various blueberry, bilberry, and cranberry shrubs, as well as Lapland rosebay, and alpine azalea. This is one of the best-represented families found above treeline. Some taxonomists place this plant in the *Rhododendron* genus, rather than *Ledum*.

**Distribution** – Regionally, this species is found in all northeastern states (except RI), and into NJ. It is also found in the Great Lakes states, and the Dakotas, the Pacific Northwest, southern Canada, and AK (figure 4). Another closely related species (*Ledum palustre*, also called Labrador tea), is found further north in boreal regions throughout the northern hemisphere.

**Conservation status** – Labrador tea is considered threatened in CT, but is more common in other regions where it is found.

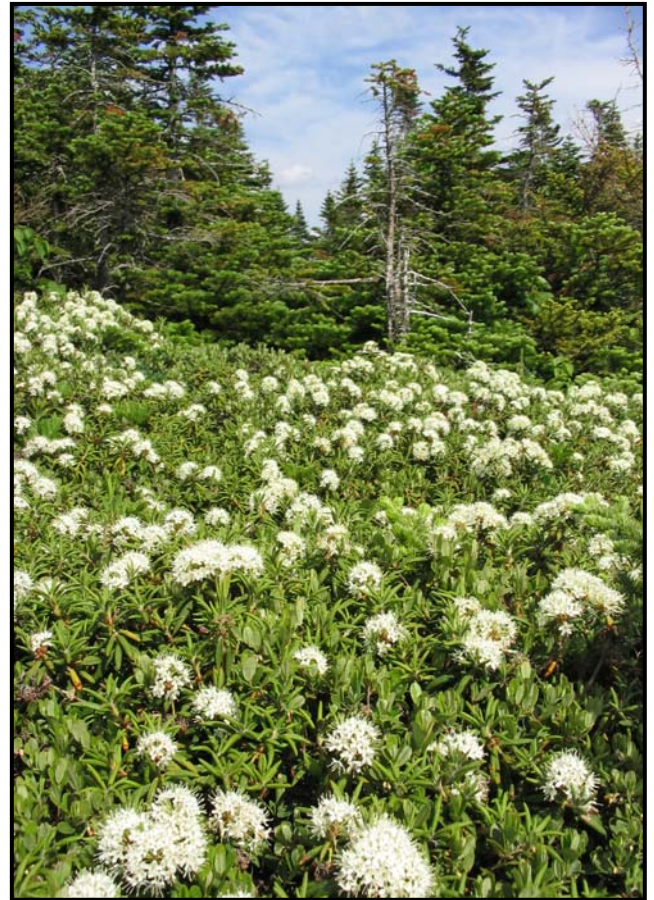


Figure 1. A patch of Labrador tea in full flower.



Figure 2. The leaf underside is not always this fuzzy, but this picture clearly demonstrates the brown hairs and rolled leaf margins.



Figure 3. Swelling leaf bud (green arrow) and flower bud (red arrow).

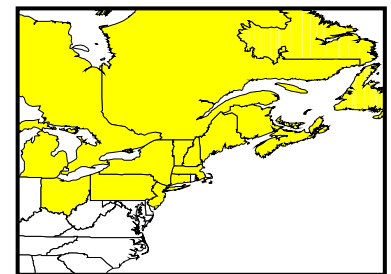


Figure 4. Regional distribution of Labrador tea.

## CHECK ALL PHASES THAT APPLY ON DATA SHEET

### Phenology phases for Labrador Tea

**Vegetative condition** – Record this phase until the flower buds begin to swell. Buds are located at the tips of the stems and are covered in brown scales. They are fairly large, and will become even larger once they begin to swell with the growing season. These buds created each fall, remain dormant through the winter, and are the source for the next years' growth (no picture).

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**Flower buds swelling or flowers emerging** – Record this phase as soon as the flower buds begin to swell; this phase is complete once all flower buds have opened. Buds can either be leaf buds or flower buds. In general, the flower buds break dormancy immediately before the leaf buds. The much larger flower buds will swell into a spherical shape with a slightly whitish color, whereas the smaller leaf buds will elongate into a thin light-green conical shape (figure 3). The flower bud scales eventually separate revealing a bumpy white surface (figure 5). Each bump is an individual flower, which will further separate and spread out on stalks before opening.

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Figure 5. Flower bud opening.

**Flowering** – Record this phase as soon as one of the white flowers has opened; this phase is complete when all of the petals have wilted or fallen. The small white flowers will open to reveal stamens (the thin thread-like male reproductive structures) between unfolded petals (figure 6). Flowers on a single branch will open at slightly different times; the outer flowers will open first.

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Figure 6. In full flower.

**Flowers shedding** – Record this phase as soon the petals begin to wilt or fall; this phase is complete once all of the petals have wilted or fallen. Individual petals will begin to drop or turn brown, leaving a greenish ovary (arrow in figure 7). Flowers on a single branch will shed at slightly different times.

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Figure 7. Petals beginning to fall, revealing a greenish ovary.

**Fruits present** – Record this phase as soon as the green ovaries begin to swell; this phase is complete when all fruits have dried and split open. Determining when the fruit has begun to develop can be difficult. A few days after the petals drop, the green ovary at the tip of a long stalk, will begin to enlarge (figure 8). Look for changes in color or swelling in comparison to others nearby. Not all ovaries will develop, as some flowers will not be fertilized and will neither swell nor form fruits. As they mature, the fruits turn reddish (figure 8), and eventually dry out, harden and turn brown (figure 9).

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Figure 8. Immature fruits beginning to develop.

**Seeds dispersing** – Record this phase as soon as a fruit capsule splits open (dehisces) and seeds disperse. Determining when seed is dispersing can be difficult; look closely at the capsules to see whether they have split open. The fruit capsules dry as they mature and turn brown (figure 9). Eventually, the hardened capsules split along the side, beginning at the base, rather than from the top down (inset in figure 9). The capsules often remain on the plant until the next growing season, so make sure you are looking at this year's capsules.

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Figure 9. Mature brown fruit capsules. Inset: dried capsule dispersing seed.

**PLEASE MAKE ALL OBSERVATIONS FROM THE TRAIL**



Date: \_\_\_\_\_ Name: \_\_\_\_\_ Mountain Range and trails: \_\_\_\_\_

To receive updates, provide e-mail address: \_\_\_\_\_ State: \_\_\_\_\_

**Instructions:** During your hike, **Stop** at a place you can locate on a map (trail junctions, summits, large stream crossing, etc...). **Look** to see if there is one or more target species growing nearby. **Fill in** the relevant information in the first observation row (target species, certainty of ID, etc...). **Mark** ALL phenology stages that apply with an "X" and **CIRCLE** the stage that appears to be dominant. **Describe** the location and **mark** the observation number on a map (see reverse side). If there is another target species at this location, fill in the next observation row, or **repeat** instructions at a different location.

Observation no.	Target Species	Certainty of identification: 1 = uncertain 2 = somewhat certain 3 = most certain	Phenology Stages							Plant Site Codes			Habitat Code(s)	Estimated Elevation (ft)	Physical Location DESCRIBE the observation location using trail intersections, summit, or other features identifiable from a map. MARK the location using the observation number on the sketch map (see next page) or other map to be submitted with this datasheet.
			Vegetative Condition	Bud Swelling / Flower Emerging	Flowering	Flower Shedding	Fruit Present	Seed Dispersing	Slope	Aspect	Distance from Trail				
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

<b>Target Alpine Species</b> Diapensia - <i>Diapensia lapponica</i> Mountain cranberry - <i>Vaccinium vitis-idaea</i> Labrador tea - <i>Ledum groenlandicum</i> Alpine bilberry - <i>Vaccinium uliginosum</i> Bigelow's sedge - <i>Carex bigelowii</i> Mountain avens - <i>Geum peckii</i>	<b>Plant Site Codes</b> Slope: Flat, Gentle, Steep Aspect: N, NE, E, SE, S, SW, W, NW Distance from trail: 0-3 feet 3-5 feet	<b>Habitat Codes</b> 1 - Deciduous dominated 2 - Coniferous dominated 3 - Mixed woods 4 - Wetland 5 - Grassland 6 - Alpine	<b>Send data sheets to:</b> Fax (603) 466-2822 Attn: Mountain Watch or Mail AMC PO Box 298 Gorham, NH 03581 Attn: Mountain Watch	<b>Notes / Comments:</b>
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Sketch a map here of hiking route or include a copy of a trail map with data. Draw North arrow on map.

**Mark observation stops on map.**