



Mosses and Liverworts of the National Forests In Alaska



United States
Department of
Agriculture

Forest Service
Alaska Region

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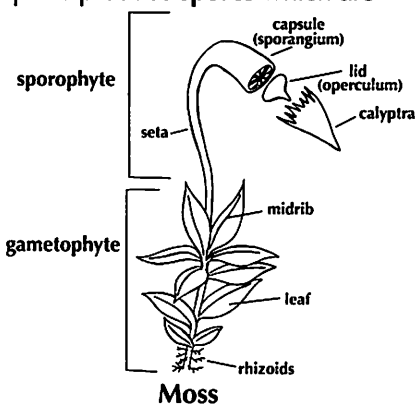


What are mosses and liverworts?

Mosses and liverworts, collectively called **bryophytes**, are small, simple, green plants that do not produce flowers or seeds and have no woody tissue. They lack true roots and complex vascular systems; however, some mosses have a central strand of simple water conducting cells. Most bryophytes must absorb water and nutrients directly through their surface tissue and transport them directly from cell to cell. Many bryophytes have tiny, branched filaments called **rhizoids**, which function for anchoring, but not absorption. Hornworts are also bryophytes, but they will not be addressed in this publication. Bryophytes evolved separately from the vascular plants, although both are thought to have green algal ancestors. There are approximately 20,000 species of bryophytes in the world.

How do mosses and liverworts reproduce?

The green bryophyte plants we see are the **gametophyte** generation, meaning they produce the male (antheridia) and female (archegonia) sex organs that provide gametes (sperm and eggs) for sexual reproduction. Bryophyte sperm move through the plant's surface water film to the archegonium via twin, whip-like flagella. Once there, the egg is fertilized and grows to form the **sporophyte** generation; a stalk (**seta**) attached to the gametophyte by a **foot**, and topped with an enlarged **capsule (sporangium)**. Young capsules often retain the protective cap called a **calyptra**. The sporophyte is parasitic on the gametophyte at least part of its life. Specialized cells in the capsule produce **spores** which are dispersed mainly by wind or water. To complete the cycle, spores landing in suitable conditions "sprout" into fine filaments (**protonema**) that progress to become mature gametophytes. This life history is known as **alternation of generations**.



Many species have separate male and female gametophyte plants that may form dispersed single-gender patches. Since water is necessary for sexual reproduction, and sperm can not travel very far, other means of reproduction are used. Some species produce clumps of cells (**gemmae**) which fall off and generate into protonema. Many can generate gametophytes

from plant fragments; this is the main method of dispersal in the Arctic.

Mosses

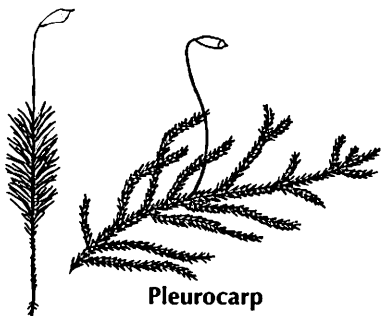
Mosses are small leafy green plants. Many plants resemble mosses but are not bryophytes, such as club-mosses (fern relative), reindeer (lichens), and Spanish moss (pineapple relative). There are an estimated 8,000–9,000 true moss species worldwide; approximately 620 occur in Alaska.

Mosses are in two general forms. The upright, usually unbranched form generates the sporophyte from the tip of the stem (**acrocarps**). In those

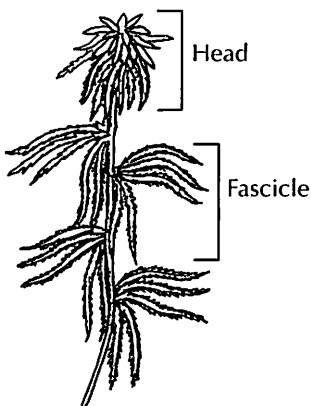
with separate male plants, the antheridia are often in cuplike structures at the stem tip.

These plants generally

grow on the ground. Plants that spread horizontally, are branched, and produce sporophytes from the side of the stem are termed **pleurocarps**. This type of moss usually grows on trees, other plants, and litter. The moss section of this brochure will be organized according to these forms.



Sphagnum mosses (peat mosses) have unique features that separate them from the other mosses. Their branches are in clusters (**fascicles**) with some branches hanging along the stem, the rest spreading away from the stem. Branch leaves have a network of large, clear, dead cells with **pores**, alternating with small, live, green cells. These dead cells with their pores are instrumental in the acquisition and storage of water. Stems have different shaped leaves which are important in species identification. None of the leaves have midribs. Sporophyte setae are weak and transparent; and when mature the capsule explodes, shooting off its lid (**operculum**) and spores with an audible "pop." Sphagnum moss is

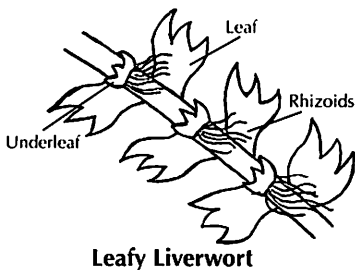


estimated to cover about 1 percent of the earth's surface, an area half the size of the United States. There are 285 species

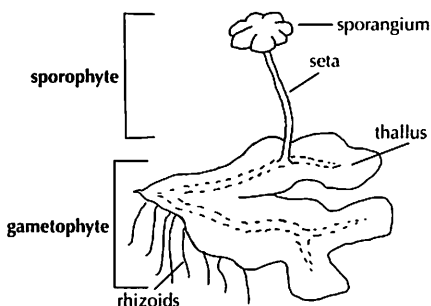
worldwide and 93 species in North America; 57 species occur in Alaska, including several recently discovered species.

Liverworts

The two forms of liverworts are quite distinctive; leafy or thalloid. Leafy liverworts are often mistaken for mosses, but the features listed above should help distinguish the two. Leaf lobes may be fringed with hairs or folded to form pockets.



Thalloid liverworts are flattened and branch or fork into two fairly equal portions (**dichotomous**), often several times. Several species have permanently open surface pores for gas exchange. Sporophyte forms vary, including umbrella-like structures on stalks and round capsules on clear setae. Worldwide there are 4,000–6,000 species of liverworts, most of which are the leafy sort. Alaska has over 200 species.



Thalloid Liverwort

How to tell a moss from a liverwort

There are a few readily observed features that may help distinguish mosses from liverworts. These include:

- ❖ Mosses are always leafy; liverworts are either **thalloid** (flat, ribbon-like) or leafy.
- ❖ Moss leaves usually have a **midrib**; leafy liverworts do not.
- ❖ Moss leaves are generally in **more than three rows**, arranged spirally; leafy liverworts usually have leaves in three rows—two laterals and one underneath (**underleaf**)—**flattened against the stem**.
- ❖ Moss leaves are **unlobed**; leaves of many liverworts have two–six lobes.
- ❖ Moss setae are **stiff, opaque**, and long-lived; liverwort setae are **soft, transparent**, and collapse after spores are shed.
- ❖ Moss capsules open by a mouth (**operculum**) surrounded by 4–64 “teeth”; liverwort capsules **split along four lines**, leaving four turned-back “petals” with no teeth.

Ecology and uses

Bryophytes have adapted to nearly all types of habitat, ranging from desert to wetlands such as fens (sedge and grass dominated) and bogs (Sphagnum dominated), forests and aquatic, alpine, and arctic conditions. Mosses, especially, have developed drought tolerance which enables them to recover and continue to grow after drying (up to 20 years). This character allows them to persist in harsh environments, often acting as pioneer species by preparing suitable habitat for vascular plant seeds to germinate. Similar to lichens, mosses retain compounds and elements and have been used as indicators of pollutant contamination. The presence of certain bryophytes are used to identify the degree of disturbance in rainforests and to monitor the effect of forest management activities on biodiversity.

Many aspects of leaf and shoot design encourage capillary action and enable surface tension to store and distribute surface water; upon drying, cell water is lost and metabolism stops. Bryophytes must rely on this close association between cells and surface water to obtain nutrients dissolved in the water.

Bryophytes act as temperature and moisture regulators on their substrates and contribute to the nutrient cycle by harboring nitrogen-fixing bacteria and collecting nutrients that fall in rain and on dust particles. Many are known to associate with mycorrhizal fungi in a symbiotic relationship. Dense colonies offer shelter for small invertebrate animals.

Mosses have been used for chinking log cabins, lining cooking pits for steaming food and bending wood, padding, wiping slime off of fish, covering floors, floral arrangements and garden decorations, packing material, and even curative teas in China. Mosses are common materials used in bird nests and capsules are eaten by ants and birds. Sphagnum has highly absorbent and antiseptic properties and has also been used as diapers, wound dressings, and soil amendments.

Hints for using a hand lens

A 10x–15x hand lens is useful for observing small details such as leaf midribs and toothed edges. Most university bookstores carry them. For best results, hold the lens close to your eye and bring the object up to the point of clearest focus.

Liverworts



Snake liverwort

Conocephalum conicum

Flat, broad (1–2.2 cm) ribbons with distinctive pattern of hexagonal markings, each with a central dot (pore). Bottom with rhizoids. Aromatic when crushed. Occasional sporophytes look like tiny toad stools; male plants produce pads with antheridia. This is our largest liverwort. The species name, *conicum*, refers to the cone-shaped sporangium. On constantly moist inorganic sandy soil, or acidic rocks.



Lung liverwort

Marchantia polymorpha

Branched ribbon 7–13 mm wide with darkened and depressed midrib. Upper surface mottled with indistinct pores and black marks; lower side black-purple with many triangular scales. Genders on separate plants; males with stalked, flattened, lobed discs; females with stalked radiating finger-like lobes. Plants usually with gemmae in flaring cups. On wet exposed soil, ditches, rock walls, and burned ground.



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Liverworts

No common name

Apometzgeria pubescens

In loose mats, nearly translucent, light- to yellow-green. Thallus narrow (2 mm), forked branching and midrib. Both sides of thallus felted with hairs. *Metzgeria conjugata* is similar, but has tiny paired hairs along the margin and underside of midrib and no hairs on upper surface. On wet, usually basic rock.



Comb liverwort

Riccardia multifida

Flat, ribbony, fan-shaped plants with branched branches 1.0–1.5 cm long. Thallus with thin, translucent edges, no midrib; usually branching at 45° to 65° angles. Most common on wet soil along streams and near rock outcrops.



Tree-ruffle liverwort

Porella navicularis

Shiny, dark green, hanging, creeping or spreading mats. Stems 10–15 cm long, simple or branched with short side branches. Upper leaves flat, lobed, overlapping like reversed shingles; smaller lower lobe tongue-shaped with edges rolled under. Underleaf tongue-shaped with rolled edges. Common on tree trunks and branches.



Liverworts



Little hands liverwort

Lepidozia reptans

Tiny, widely spaced branches. Upper leaves short, with 3–4 pointed lobes curved downwards resembling a gloved hand. Underleaves smaller, not curved. In loose mats on well-rotted wood and hanging from moist cliffs.



Frilly liverwort

Ptilidium pulcherrimum

Occurs in dense, firmly attached, yellow-green to reddish brown patches. Leaves short, divided into 4–5 irregular lobes, each fringed with cilia (long hair like projections). On tree bases, rotting wood, rocks, and soil. *P. ciliare* forms red-brown to coppery-red mats easily removed from the substrate. Leaves are twice as large as *P. pulcherrimum* and more densely ciliated. Over rock or thin soil on rock. Very slippery when wet.

Liverworts

Jagged notchwort

Lophozia incisa

Frilly, whitish-green upper leaves have 2–4 uneven lobes with irregular arrangement; lobes with toothed margins; underleaves absent. Most other *Lophozia* species have leaves with just 2 lobes. The related *Barbilophozia* group of species has 3–4 lobes consistent in their size and placement. On decaying logs and organic soil in forest.



Hard scale liverwort

Mylia taylori

Luxuriant dense reddish-green to carmine-red mats or thick turfs 3–12 cm tall. Upper leaves unlobed, concave, overlapping like shingles with edges bent backwards. Underleaves lance-shaped, obscure. Most often on lowland forest and forested peatland logs. *M. anomala* is smaller with narrower leaves and mixes with *Sphagnum fuscum* in bogs; upper leaves often with yellow gemmae on edges.



Sphagnum Moss



Shaggy sphagnum

Sphagnum squarrosum

Bright to pale green loose carpets; individuals are large and tend to be separated. Stems green to red-brown. Leaf tips bend abruptly at right angles to the stem, giving plant a distinctive bristly appearance. Oval stem leaves with a slight fringe across the broad tip. Common in swamps, sedge-dominated fens, and peaty soils in forests.



Common brown sphagnum

Sphagnum fuscum

Compact clumps of small, slender brown to brown-green plants with brown stems. Stem leaves blunt, tongue-shaped; branch leaves pointed lance-shaped. Common on tops of drier or older hummocks in open bogs and fens.



Sphagnum Moss

White-toothed peatmoss

Sphagnum girgensohnii

Loose mats of always green, robust plants with large, flat-topped, star-shaped heads. Stems green to brown, wiry; "snap" when bent. Stem leaves shaped like broad tongues with flat top edge torn, like having been cut with pinking sheers. Occurs in forest and edges of bogs and fens.



Midway peat moss

Sphagnum magellanicum

Plants reddish to reddish purple, or light green in shade; large, robust, with red stems; branches short-pointed, swollen. Stem leaves tongue-shaped. Branch leaves large, very concave, with edges and tip rolled under. Common on sides of drier hummocks in open acidic bogs. *S. papillosum* (Fat bog moss, lower photo) looks similar to midway peat moss, but is yellowish to brown, has a brown to blackish stem, and individuals separate easily. Forms dense carpets in open fens and bogs.



True Mosses – Pleurocarps



Stair-step moss

Hylocomnium splendens

Plants creeping, 2–20 cm; stems reddish, twice branched, with abundant green filaments. Sporophytes uncommon, seta red-brown, capsule brown, nearly vertical. Current year's growth arises from center of previous year's branch, forming characteristic stair-step effect. The age may be estimated by counting the number of "steps." Often covers coniferous forest floor and rotting logs.



Knight's plume

Ptillium crista-castrensis

Green to golden-green neatly arranged mats, stems 3–12 cm tall. Branches symmetrically branched, in feathery plumes. Branch and stem leaves short, pleated, egg-shaped; all curved toward the branches and stem below. Sporophyte with reddish seta; capsule curved, held horizontally, short, chestnut brown. Forest floor, occasionally on bog edges.

True Mosses – Pleurocarps

Red-stemmed feather moss

Pleurozium schreberi

Extensive, loosely interwoven light- to yellow-green mats, 7–16 cm high; stems orange to red, irregularly branched. Short, upright leaves, oblong to oval, tip rounded, sides rolled inward, no midrib. Sporophytes uncommon; seta red-yellowish; capsule cylindrical, held horizontally. This plant does not seem to reproduce vegetatively. Drier acidic, poor soils, rocks, on tree bases, and in bogs.



Giant feather moss

Calliergon giganteum

Yellow-green, green, yellow-brown, to over 20 cm long in deep loose clumps. Stems branched, feathery. Leaves stand out from stem; stem leaves egg-shaped, tip blunt, midrib strong, areas of distinctly enlarged and clear cells in corners of leaf base; branch leaves smaller, more slender. Sporophyte with cinnamon colored seta, capsule curved. Occurs in rich fen ponds, often floating.



True Mosses – Pleurocarps



Sickle moss

Sanionia uncinata

Feathery, irregularly branched 2–5 cm long, in yellow-brown to brown tufts or mats. Branch tips and leaves sickle-shaped. Leaves narrow and pleated lengthwise, strong midrib; tips curled nearly into semi-circles, bent in same direction on stem. Sporophyte with long, red seta, twisted; capsule curved, almost horizontal. At moist bases of large boulders, often occurring with stair-step moss. Also known as *Drepanocladus uncinatus*.



Curly Hypnum

Hypnum subimponens

Small, regularly branched creeping stems. Leaves sickle-shaped, bent to same side of stem, short, slenderly sharp pointed and slightly serrated, no midrib. Sporophytes common; seta long, reddish, capsules curved, long-cylindrical, smooth, nearly upright. *H. circinale* (coiled-leaf moss) has stems irregularly branched with braided appearance. Capsule shorter, nearly vertical. Both species often grow together in hanging or descending mats on tree trunks and rocks.

True Mosses – Pleurocarps

Cat-tail moss

Isoetes myosuroides

Irregularly branched stems. Leaves short, upright, edges toothed; midrib prominent to about 2/3 length of leaf. Sporophytes common, seta brownish, capsule short-cylindrical, erect. Branching and sharpness of leaf tips quite variable. Forms long, tapering strands that hang from branches, or creeping mats over boulders and logs. Noticeably absent from forest floor. The most common and variable moss of coastal rainforest.



Hanging Moss

Antitrichia curtipendula

Forms large rusty-green to orange-green cushions or balls with branched stems to 15 cm, usually angled downward. Leaves medium, not pleated, with edges rolled under; midrib long flanked by 2 shorter ribs. Easy to confuse with lanky moss which has pleats, plane edges, and 1 midrib. Sporophytes uncommon, seta long, capsule smooth, straight to slightly curved. Festoons tree trunks and branches, especially in more open forest gaps.



True Mosses – Pleurocarps



Lanky moss

Rhytidiadelphus loreus

Large yellow- to dark green plants (to 15 cm long) in loose creeping mats; branches widely spaced, narrowing to fine points. Leaves medium, obviously pleated, slightly curved, broadly egg-shaped narrowing gradually to long, slender point; obscure double midrib. Sporophytes occasional, seta red-brown, capsules nearly vertical, smooth, nearly spherical. Often the dominant ground cover in lowland and montane forests.



Electrified cat's-tail moss

Rhytidiadelphus triquetrus

Has irregular branching and spreading, shaggy, slightly pleated leaves, with strong double midrib. On humus-rich forest floors.



Bent-leaf moss

Rhytidiadelphus squarrosus

Upright, irregularly branched to unbranched; leaves not pleated, spread at right angles to stem, tips bent backwards; looks bristly. Occurs in disturbed habitats, lawns, and roadsides.

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True Mosses – Pleurocarps

Clear moss

Hookeria lucens

A distinctly flattened, whitish-green moss forming small patches; stems to 8 cm long. Leaves medium, flat, egg-shaped, blunt tipped; no midrib. Large, thin-walled cells (visible with hand lens) give the leaves a translucent appearance. Sporophytes uncommon; seta dark, capsules smooth, nearly vertical. On rich forest floor humus.



Wavy-leaved cotton moss

Plagiothecium undulatum

Large, glossy, pale whitish-green plants in mats; stems 3–15 cm long, little branched, conspicuously flattened. Leaves medium, egg- to lance-shaped with transverse wrinkles toward the tip; midrib short, double. Sporophytes common; seta dark red to light brown; capsule smooth, curved, nearly vertical. On logs, humus, tree stumps in shaded forest. Also known as *Buckiella undulata*.



True Mosses – Pleurocarps



Common water moss

Fontinalis antipyretica

Large, branched plants to 40 cm long, dark green to brownish; stems noticeably 3-angled. Leaves long, arranged in 3 rows along the stem; lance-to nearly egg-shaped, sharply pointed, without midrib. Leaves lie folded when removed from plant. Sporophyte rare; seta short; capsule spherical, obscured by leaves. Attached to rocks and logs in flowing water.



True Mosses - Acrocarps

Fan moss

Rhizomnium glabrescens

Common, in patches up to 3 cm tall. Leaves medium, shriveled against stem when dry, oval, blunt tipped. Leaf border obvious, smooth edges. Sporophytes common; seta long, capsule cylindrical, smooth and hanging. Male plants with flower-like clusters at tip. On rotting logs, humus and soil over rocks. Look for larger *R. magnificum* with stem covered by densely branched rhizoids. Closely related *Plagiomnium* species have single teeth along the edges; *Mnium* species have double teeth.



Badge moss

Plagiomnium insigne

Largest of the "Mnium" group, 3–7 cm tall. Leaves shrivel when dry, long, oval- to egg-shaped, sharp-tipped margins with single teeth to the base; border of long cells extend down sides of stem from leaf base. Sporophytes common; seta long, 3–6 per plant, capsule broad, cylindrical, smooth, hanging. Male plants with conspicuous flat heads (inset). On humus and exposed soil; common along trails.



True Mosses - Acrocarps



Common hair-cap moss

Polytrichum commune

Dark green, 4–45 cm tall; lower stem covered by grey rhizoids. Leaves upright when dry, long, coarsely toothed, lance-shaped with long sharp point and sheathing base. Upper surface of leaves covered with 20–50 lamellae (strips of stacked cells, lower photo). Sporophytes with long seta; capsule horizontal and four angled. Male plants with enlarged terminal head; subsequent growth sprouts from current tip, thus annual growth may be observed along the stem. On moist organic soils.



Contorted hairy cap

Pogonatum contortum

Forms tall (3–12 cm) dark green turfs. Leaves spread when moist, contorted and curly when dry. Leaves long, lance-shaped; upper surface covered by up to 40 lamellae; margins narrow, toothed, translucent. Sporophyte with seta medium, capsule erect, cylindrical, with hairy calyptra. The genus name means 'born with a beard', referring to this feature. Most often on disturbed mineral soil, especially in forested areas.

True Mosses - Acrocarps

Dusky fork moss

Dicranum fuscescens

Small, dull green to dark green plants 1–4 cm tall with reddish-brown stems, in patches or cushions. Leaves sickle-shaped, all bent to one side of stem, long, contorted when dry. Sporophytes common; seta short, yellowish- light green; capsule nearly vertical; dry capsule with lengthwise furrows, asymmetrical. On rotting logs, tree bases, and humus in forests.



Apple moss

Bartramia pomiformis

Whitish- to yellow-green, upright stems 2–10 cm long; usually with abundant red hairs. Leaves contorted, especially when dry, narrowly lance-shaped, long, edges bent backwards, strong midrib. Sporophyte common with short seta; capsule erect and spherical (young), horizontal and a bit asymmetrical (older). The young capsules resemble little green apples, hence the species name, *pomiformis*, meaning apple form. On roadsides, cliffs.



True Mosses - Acrocarps



Red roof moss

Ceratodon purpureus

Reddish-green mats or tufts 1–2 cm tall. Leaves short, contorted when dry, lance-shaped, edges bent backwards, a few notches at tip. Sporophytes common; seta reddish (young) to purple (mature); capsule green and nearly upright when young, maturing abruptly to horizontal, 8-ribbed and reddish-brown to purplish. Possibly the most common moss in the world. On roofs, and in disturbed sites such as roadsides, soil exposed by uprooted trees, even sidewalk cracks.



Cord moss

Funaria hygrometrica

Weedy, short (<1 cm), light green, nearly bulb-shaped. Leaves medium, upright, concave, oval, shiny, and contorted when dry. Sporophyte common; seta contorted, yellow; capsule hanging and pear-shaped, green (young), yellow (mature). On disturbed, compacted soil, in moist depressions of burned areas, and often a pest in greenhouses.

True Mosses - Acrocarps

Tall clustered thread moss

Bryum pseudotriquetrum

In mats or tufts 2–8 cm tall, stems red. Leaves medium, egg-shaped, blunt to sharp-pointed, edges bordered with long cells. Edges at base of leaves continue down along the stem. Sporophytes uncommon, seta long, red to pale green; hanging capsule smooth and cylindrical. In seeps, fens, streambanks. One of few species in this genus identifiable in the field.



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Common four-tooth moss

Tetraphis pellucida

Small, dull green to red-brown plants 8–15 mm tall. Leaves flat, erect and spreading; appear to be in three rows. The toothless leaves are nearly transparent when wet. Sporophyte erect, twisted when dry; capsule cylindrical, smooth, with only four teeth. *T. genuflexa* (lower photo) similar, but less common. Seta is sharply bent. If you can kick a rotten stump or log and not hurt your toe, these 2 species are likely there.



True Mosses - Acrocarps



Dung moss

Tetraplodon mnioides

Dense tufts, 1–6 cm tall, tops green, lower portion yellow-brown with many rhizoids.

Leaves medium, lance- to egg-shaped, widest above middle, with long, awl-shaped tip; edges smooth and rolled inward. Sporophytes common; seta short, stiff, dark red; cylindrical capsule erect with 4 teeth, dark red to black, lower part slightly wider than upper. On dung and animal remains. Flies disperse the sticky spores to other nitrogen-rich substrates.



Swamp moss

Philonotis fontana

Dull, yellow- to whitish-green mats or cushions; red stems 1–10 cm tall. Leaves short, lance- to egg-shaped, edges curved downward. Sporophytes uncommon, appearing to arise from side of stem due to continued growth of stem. Seta long, capsule round and upright (young); 16-ribbed, asymmetrical, and horizontal (old). In moist places, especially associated with calcium-rich water.

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True Mosses - Acrocarps

Ribbed bog moss

Aulacomnium palustre

Yellow-to brownish- or reddish-green. Upright stems 3–9 cm long, lower portion covered thickly by reddish hairs. Tip of plant often with lance-shaped gemmae along a special leafless stem. Leaves medium, lance-shaped, broadly sharp pointed, edges bent backwards. Midrib prominent nearly to tip. Leaves contorted when dry; Sporophytes occasional; seta long, capsule ribbed, cylindrical and horizontal. On disturbed peaty banks in acidic bogs, organic soil, and occasionally on rotting logs.



Streamside moss

Scouleria aquatica

Floppy, dark black-green plants with reddish-brown rhizoids on stem and leaf bases. Highly branched stems to 15 cm long. Leaves medium, toothed and blunt tipped; edges rolled under near base. Sporophyte immersed in leaves with a dark brown-black, nearly spherical capsule on short seta. Dry capsules rimmed with red teeth. In splash zone of swift streams; in black mats when submerged.



True Mosses - Acrocarps



Common tree moss

Climacium dendroides

Large, tree-shaped plants 2–10 cm tall, connected underground by horizontal stems. Stems with many small, green filaments between leaves. Branch leaves short, egg-shaped, sharp-pointed, pleated, and toothed. Stem leaves upright, broader, pointed, not pleated, and pressed against the stem. Sporophytes rare; capsules upright. On lake edges, in flood plain forest, humus-rich woods, peatlands.



Menzies' tree moss

Leucolepis acanthoneuron

Tree-shaped with circle of branches, umbrella-like, at tip of 4–8 cm long stems. Branch leaves short, broadly lance-shaped, strongly toothed, bordered with elongate cells. Stem leaves pale, nearly white, triangular and toothed. Sporophytes common, seta long, capsules dark, egg-shaped to cylindrical, smooth, and hanging. Forms large colonies on humus, organic soil, logs, boulders, and tree bases; found on the Tongass National Forest only. Source of yellow dye for baskets.



True Mosses - Acrocarps

Hoary rock moss

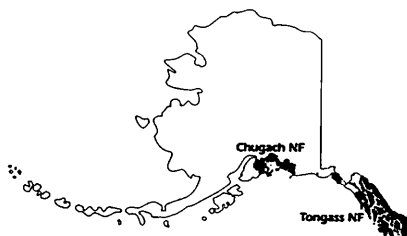
Racomitrium lanuginosum

Large whitish- or gray-green mounds; stems 4–12 cm long, irregularly branched. Leaves medium, narrow, lance-shaped with long, slender, clear bristle-point, contrasting with green lower portion; midrib strong. Sporophytes occasional; seta short, capsules upright and smooth. The overlapping, long-bristled leaf tips help protect from drying wind and sun. On drier acidic rocks and peatlands. Although this moss looks like a pleurocarp moss, it is an acrocarp; the sporophytes arise from the tips.



Pioneering mosses and lichens on glacier-scoured rock at Mendenhall Glacier Visitor Center, Juneau, Alaska.

Mosses and Liverworts of the National Forests in Alaska highlights 51 of the more common bryophytes found in the Alaska Region of the USDA Forest Service. This Region includes the Tongass National Forest, the nation's largest at 17 million acres, and the 5-million acre Chugach National Forest. The Tongass encompasses most of southeastern Alaska, and the Chugach generally surrounds Prince William Sound.



Photos were provided by: Ellen Anderson, Brett Calhoon, Martin Hutten, Rick Turner, and Michael Lüth (@ USDA-NRCS PLANTS Database / Lüth, M. 2004. Pictures of bryophytes from Europe [CD-ROM]. Published by the author). **Illustrations** by Rick Turner.

This brochure was developed by the Tongass National Forest Botany and Ecology Program in cooperation with Chugach National Forest and the Alaska Region.

Suggested field references for additional information: *Plants of the Pacific Northwest*, Pojar and MacKinnon; *Mosses Lichens & Ferns of Northwest North America*, Vitt, Marsh, and Bovey; *Some Common Mosses of British Columbia*, Schofield; and *Field Guide to Liverwort Genera of Pacific North America*, Schofield.

Cover photograph: White-toothed peatmoss (*Sphagnum girgensohnii*) draping a forest log on Admiralty Island southeast Alaska. Photo by Ellen Anderson

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