

The Biodiversity of a
New England Woodlot Series:
Mosses and Liverworts



Common Mosses and Liverworts of New England Woodlots

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A green collage of mosses and liverworts, collectively known as bryophytes, are splashed as from an artist's brush throughout New England woodlots. Found growing on rotting logs, tree trunks, stumps, rocks, and soil, mosses and liverworts comprise a significant part of the native biodiversity of our woodlots (Cleavitt 1996).

Bryophytes are green plants that lack a specialized vascular or conductive system. Liverworts are of two different types: thallose and leafy. Thallose liverworts resemble green ribbons on the forest floor, while leafy liverworts resemble mosses and thus are often confused with them (Glime 1993). However, mosses and leafy liverworts differ in anatomical features that, if recognized, can permit their identification (Schofield 1992). Some of the more obvious differences are as follows.

- Mosses have small leaves that are usually in more than three rows around the stem; leafy liverworts have three rows of small leaves, two lateral in one plane and one ventral (on the underside) (Schofield 1992). The two lateral rows that lie in one plane give the leafy liverworts a flat appearance (Glime 1993).
- Moss leaves are not dissected or lobed, a condition which often occurs in leafy liverworts (Glime 1993).
- Moss leaves commonly have a midrib (use a 10x hand lens); leafy liverworts never have a midrib (Schofield 1992).
- Moss capsules (also called spore cases, sporangia, or fruits) frequently have a top that pops off (see Schofield 1992, p. 5); liverwort capsules split into a four-pointed star (see Vitt and others 1988, p. 141).

Both mosses and liverworts perform a vital function for forest ecosystems by retaining and slowly releasing water to forest soils, which helps reduce the harmful effects of droughts and erosion from overland flow. They also help maintain humidity, retain

nutrients on the forest floor, and may aid in filtering heavy metals. Some bryophytes that are sensitive to sulfur dioxide are useful in pollution monitoring (Glime 1993).

The fascinating miniature world of mosses and liverworts can offer people intrigue, refreshment, solace, and communion with nature. Mosses growing on old structures such as rotting wood, stone fences, and even tombstones give us a strong sense of time, place, and grounding to our lives. Mosses even reach mythological proportions as Janice Glime refers to in the title of her 1993 field guide, *The Elfin World of Mosses and Liverworts of Michigan's Upper Peninsula and Isle Royale*. Those who have visited Cathedral Woods on Maine's Monhegan Island can attest to this view. There, "gnome" houses are constructed for the resident elves by children and young-minded adults using small pieces of wood, cones, lichens, mosses, and liverworts, among other earthly items.

This article is intended to acquaint you with some of the more common (and more easily recognizable) mosses and liverworts that you would expect to find in a typical New England woodlot. These species are listed in alphabetical order by scientific name; common names are provided where available. This list is by no means exhaustive, but instead is just a sampling.

The descriptions were taken largely from field guides by Dale Vitt, Janet Marsh, and Robin Bovey (1988), Janice Glime (1993), and W.B. Schofield (1992), but also include some of our observations. Common names are taken from Glime. Vitt and others and Glime primarily use photographs to display species, while Schofield uses drawings. We have provided specific page references to photographs and drawings in these field guides, which are excellent resources for those who want to explore the enchanting world of mosses and lichens to a greater extent.

Bazzania trilobata (three-lobed Bazzania)

This liverwort has asymmetrical leaves in two rows that drape down the side of each stem. Each leaf has a broad tip with three small teeth or lobes. As in other liverworts, the **seta** (or stalk) of the capsule is soft and collapses soon after the spores are shed from the sporangium whereas in mosses, the seta is usually rigid and persists for an extended period (Schofield 1992).

Habitat—Logs and stumps.

Referred Images—Glime (p. 87).



Top view of *Bazzania trilobata* and bottom closeup view of *B. trilobata*.

Qtvj qficranum xtkfg (broken fork moss)

Description—This moss is dull, dark green to bright green. The leaves are crowded, erect-spreading to erect-incurved with fragile points that are often broken.

Habitat—Tree trunks; rarely on rocks.

Referred Images—Glime (p. 89).



Top view of *Qtvj qficranum xtkfg*, and bottom closeup view of *Q. xtkfg*.

Dicranum montanum (mountain fork moss)

Description—Leaves look like corkscrews, which serve as vegetative propagules that break off and form new plants on suitable substrate. Capsules are straight.

Habitat—Tree bases, logs, and forest boulders.

Referred Images—Glime (p. 75).



Top view of *Dicranum montanum* and bottom closeup view of *D. montanum* showing corkscrew shape of leaves.

Dicranum scoparium (broom moss)

The common name comes from the swept appearance of its leaves on the stem. They form soft, round cushions with nonundulate, sickle-shaped leaves that curve in one direction. Distinguished from other *Dicranum* species by large teeth (visible with a 10x hand lens at the end of the leaf) and by ridges along the underside of the **costa** (nonvascular nerve of leaf--sometimes double, sometimes single, sometimes absent). Ranges in color from yellow-green in sun to deep green in shade. Capsules are curved.

Habitat—On rotten logs, exposed cliff edges, and sometimes on forest floor and tree trunks.

Referred images—Glime (p. 65); Schofield (p. 125); Vitt and others (p. 124).



Top view of *Dicranum scoparium*, and bottom closeup view of *D. scoparium* showing the broom swept appearance of the foliage.

Diphyscium foliosum (grain of wheat moss, powder gun moss, or nut moss)

Female and male plants differ in appearance. The female is easily identified; its stalkless capsules resemble “seeds” scattered on the ground. The male has long, strap-shaped leaves.

Habitat—Forest floor, disturbed areas. Look for this moss on disturbed soil along edges of older forest roads.

Referred Images—Glime (p. 68).



Top view of *Diphyscium foliosum*, and bottom closeup view of *D. foliosum* showing the female plant with its stalkless capsules that resemble a grain or nut surrounded by long hairs (leaves).

Frullania sp (liverworts)

Description—Dark reddish, purplish, or brown; green when young. Leaves of *Frullania* are round and have a smaller round, deeply concave lobe on the underside of the leaves (or technically, they have complicate bilobed leaves with the lower lobe much smaller and hidden). *Frullania* grows horizontally. Very fine, lacy growth pattern.

Habitat—Tree trunks.

Referred Images—Glime (p. 84); Vitt and others (p. 152).



Top view of *Frullania sp.*, and bottom closeup view of *Frullania sp.* showing the growth pattern on tree bark.

Hylocomium splendens (mountain fern moss, mountain feather moss, or stair step moss)

Description—Forms loose carpet of interwoven, upward arching shoots. Resembles a small fern. Leaves are flat in appearance, growing in same plane. A new branch grows each year in the middle of the top branch, arching upward in stair-step fashion. Stems are reddish like *Pleurozium schreberi*, which may cause confusion, but branches are flat. Plants are brownish green and can be either dull or glossy.

Habitat—Usually terrestrial or on decaying logs in forests.

Referred Images—Glime (p. 98); Schofield (p. 171); Vitt and others (p. 107).



View of *Hylocomium splendens* showing stair-step growth pattern.

Leucobryum glaucum (cushion moss or powder puff moss)

Description—Tight, whitish-green cushions or clumps. Appears whitish because some cells of the costa do not have chlorophyll.

Habitat—Forest floor.

Referred Images—Glime (p. 70).



Top view of *Leucobryum glaucum* showing clustered growth pattern, and bottom closeup view of *L. glaucum* showing the whitish leaves (leaves have several layers of colorless cells which hide the color of the chlorophyll).

Neckera pennata (feather flat moss)

Description—Leaves are rippled like a “lake on a breezy day” (Glime 1993); or, in technical terms, the leaves are strongly, transversely undulate. Branches are flat in appearance with elliptical, short-pointed leaves twisted to extend on only two sides of the stem

Habitat—Grows on trunks and branches of trees, and on rocks. Leaves stand out from surfaces in shelf-like appearance.

Referred Images—Glime (p. 80).



Top view of *Neckera pennata* showing shelf-like growth of moss away from tree trunk, and bottom view of *N. pennata* showing wavy appearance of leaves.

Pleurozium schreberi (red-stemmed moss or big red stem)

Description—Forms extensive mats of yellow-green, shiny, feathery branches with red stems. Broadly ovate leaves with an **apiculate tip** (leaf ending in an abrupt, short, sharp point) and short double midrib. Similar to *Hylocomium splendens*—it has a stem with branches, but, unlike *Hylocomium*, has no secondary branches. Important ground cover.

Habitat—In sterile litter and on rock. Occasionally ascends tree bases. Also found in bogs.

Referred images—Glime (p. 99); Schofield (p. 219); Vitt and others (p.107).



Top view of *Pleurozium schreberi* showing the feathery growth pattern, and bottom closeup view of *P. schreberi* showing the reddish stems. This moss is very common in boreal forests.

Polytrichum commune (common haircap, great Goldilocks)

Description—Forms dense, tall turfs 50–500 mm tall. Leaves are divergent from the sheathing bases when humid, becoming incurved when dry. Toothed leaf margins, angled capsule, and shiny sheathing bases of the leaves are also useful field marks.

Habitat—Common on moist, organic soils, reaching their greatest size in swamp margins.

Referred Images—Schofield (p. 235); Vitt and others (p. 56).



Top view of *Polytrichum commune* showing the upright growth pattern, and bottom closeup view of *P. commune* showing the hairy caps (or calyptra) of the capsules (except for capsule furthest to the left which has lost its calyptra). Capsules are angular in shape with a brownish or whitish membrane on top.

Polytrichum juniperinum (juniper hairy cap moss)

Description—Bluish green, the color of juniper. Forms short to tall turfs 10–100 mm tall. Leaves are strongly divergent when dry and have reddish **hair points** (fine tapering of leaf tips into hair-like projections).

Habitat—Found on open, dry sterile soil and within forests. Also found on road banks and cliff ledges.

Referred Images—Glime (p. 101); Schofield (p. 237); Vitt and others (p. 57).



Top view of *Polytrichum juniperinum* and bottom view of *P. juniperinum* showing the capsules.

Polytrichum piliferum (awned hairy cap moss)

Description—Forms short turfs (10–20 mm tall) with wine-reddish stems. Tips of leaves extend into long, white hair points, and leaf blades are incurved. Sometimes the whole plant is tinged with red. Male plants have splash cups made of specialized leaves that resemble flowers and contain **antheridia** (sperm containers). Rain splashes the antheridia as far as 1 meter away. Some of these antheridia will land on female plants, swim to the **archegonium** (egg sac), and fertilize the egg. If this happens, the stalk and capsule will form on the female plant.

Habitat—Shallow soil over rock and open sandy soil.

Referred Images—Glime (p. 103); Schofield (p. 239); Vitt and others (p. 58).



View of *Polytrichum piliferum* showing the splash cups which are specialized leaves holding the antheridia (sperm containers).

Rhytidiadelphus triquetrus (shaggy moss)

Description—Name referring to the triangular leaves and the occasional three-rowed arrangement of the uppermost leaves of stem. Coarse, pale yellow-green plants with untidy, divergent leaves of the main stem tip and upper branches; strongly pleated, partially wrinkled. Two strong midribs on leaves. Orange-red stems.

Habitat—Well-drained sites in coniferous forests; boulders, logs, and cliff shelves.

Referred images—Glime (p. 106); Schofield (p. 261).



View of *Rhytidiadelphus triquetrus* showing yellowish color and shaggy appearance.

Tetraphis pellucida (four tooth moss)

Description—Forms short, dark to pale green turfs of erect, unbranched plants. The **peristome** (the apical opening of the moss capsule through which spores are shed) is ringed by four peristome teeth. This moss seasonally has **gemmae** or asexual reproductive structures (tiny bits of plant tissue) that grow in a leafy “cup” on top of the stems. The cups resemble a miniature bird’s nest with eggs.

Habitat—Usually on well decomposed wood such as logs and stumps, but also on sandstone and soils high in organic matter.

Referred Images—Glime (p. 94); Schofield (p. 285); Vitt and others (p. 61).



View of *Tetraphis pellucida* which grows on well-decayed stumps and logs. This moss has 4-parted capsules, which is unique among the mosses.

Thuidium delicatulum (delicate fern moss)

Description—Appears like tiny ferns or white cedar (genus *Thuja*) foliage. Tiny, yellowish leaves have **papillae** (bumps) on the cell surfaces, giving them a dull appearance. Stems are covered with **paraphyllia** (tiny branched threads) among the leaves. *Thuidium* has a branching pattern similar to *Hylocomium*, but differs from it in that the plants are not glossy and tend to be yellow green rather than brownish green, and the stems are not conspicuously red.

Habitat—Forest floor.

Referred Images—Glime (p. 74).



Top view of *Thuidium delicatulum* showing fern-like appearance of leaves, and bottom closeup view of *T. delicatulum*.

Ulota crispa (curled leaf moss or curled bristle moss)

Description—Grows in dark green clumps on tree trunks above tree bases. Similar to *Ulota coarctata* but spore capsule is straight and pleated when empty. *U. coarctata* has pear-shaped spore capsules which are puckered to a narrow mouth as if with a drawstring. Able to grow higher on tree trunks because of its adaptation to increased light and drier conditions. The term *crispa* refers to its curled and twisted leaves when dry. The leaves are straight when wet.

Habitat—Tree trunks.

Referred Images—Glime (p. 83).



Top view of dry curled leaves of *Ulota crispa* and bottom closeup view of *U. crispa* in moist condition.

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