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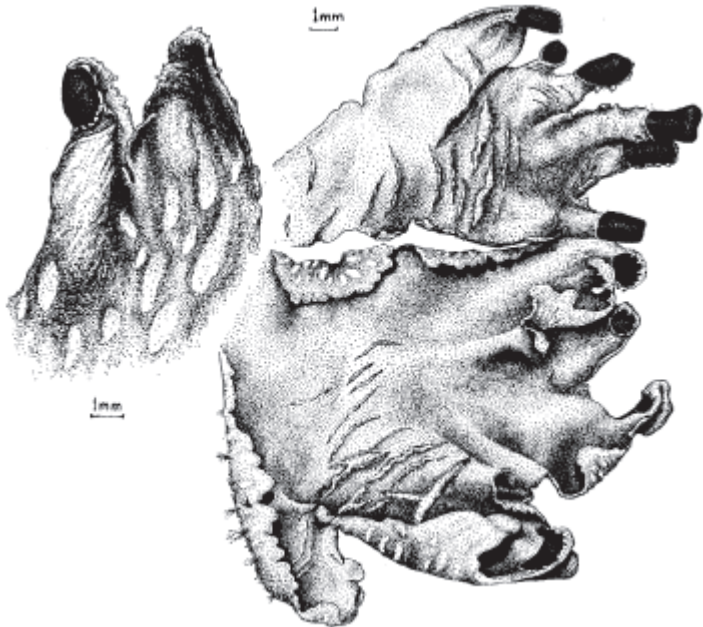
Umatilla  
National Forest

2006



# Guide to Common Macrolichens and Bryophytes of the Umatilla National Forest

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## IMPORTANT NOTES

This guide is based on an initial survey of the bryophytes and macrolichens of the Umatilla National Forest. It should be considered a **STARTING POINT**—common taxa are represented, but this is not a complete inventory.

It is hoped that this guide will aid in the identification of some common macrolichens and bryophytes of the Umatilla, and in awareness of a few sensitive taxa. Determinations should always be compared with herbarium material and full descriptions. This book has two main sections, macrolichens and bryophytes. Keys to the genera of the lichens are presented first and are followed by keys to species and then pictures and short descriptions of the taxa. In the second section, there is a key to the bryophyte species, followed again by the pictures and descriptions. Keys and descriptions of the taxa are based on the references listed, and sensitive taxa are noted as such. A checklist of the mosses known to occur on the Forest is presented at the end, along with an index to taxa. Where look-alike taxa are mentioned, they are known, suspected, or potentially found in eastern Oregon.

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**IMAGES**-- The cover image of *Peltigera neckeri* is by Alexander Mikulin and is provided courtesy of the USFS. Several other images are used with permission from other sources and are so cited. These may not be reproduced.

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## KEY TO THE MACROLICHENS

*Note: This key is for taxa presented in this guide only. Keys for species within genera follow the initial key to taxa.*

- 1a. Thallus composed of two parts: small squamules, and reproductive portions which are tall, fruticose podetia (sometimes with brown or red structures at the very top of these). Generally grayish green to blueish or brownish green in color ..... *Cladonia*
- 1b. Thallus either foliose or fruticose, but not composed of two different parts as above, colors various ..... 2
- 2a. Thallus fruticose, generally bushy or pendant, not differentiated into a top and bottom side (one sp., *Evernia prunastri*, has the narrow-lobed pendant appearance of a fruticose lichen but keys below because the flattened lobes have a top (yellow-green) and bottom (whitish) ..... 3
- 2b. Thallus foliose, flattened to the substrate or with ascending portions, but with a generally broadly flattened form that has a top and a bottom side ..... 8
- 3a. Thallus filamentous (stringy) and darkly colored, olive gray to reddish brown or dark brown ..... 4
- 3b. Thallus bushy or filamentous, light yellow to bright yellow-green ..... 5
- 4a. Thallus branches reddish brown (hold against a black background); no soredia, isidia, or pseudocyphellae (irregular breaks in the surface lacking specialized cells); apothecia common ..... *Nodobryoria*
- 4b. Thallus branches olive gray to brown or blackish when dry, often with pseudocyphellae ..... *Bryoria*
- 5a. Thallus bright yellow-green, not long pendant ..... *Letharia vulpina*
- 5b. Thallus cream to yellow or light yellow-green, often long pendant ..... 6
- 6a. Branches of thallus with a distinct central cord (pull branches gently with fingers) that is usually white, apothecia rare, pseudocyphellae absent ..... *Usnea*
- 6b. Branches lacking a central cord, apothecia and pseudocyphellae present or not ..... 7
- 7a. Thallus generally round in cross section, with elongate whitish pseudocyphellae that may spiral around branches, soredia absent ..... *Alectoria*
- 7b. Thallus often flattened or irregular in cross section, lacking pseudocyphellae, soredia present or not ..... *Ramalina farinacea*
- 8a. Thallus translucent and somewhat jelly-like when wet, typically dark brownish or grayish, thallus relatively uniform in color throughout when cut in cross section (dark color not confined to one layer) ..... *Leptogium*

- 8b. Thallus not translucent when wet, colored portion in a definite layer when seen in cross section ..... 9
- 9a. Thallus umbilicate, with a central holdfast on lower surface (in one species appearing more broadly attached and is distinctively grass green when wet and growing on periodically submerged rocks) OR lichens unattached and rolling freely, usually in dry grassland or shrubland .... 10
- 9b. Thallus attached to substrate at more than one point and not as above .. 11
- 10a. Thallus umbilicate (or appearing broadly attached, grass green and growing on periodically submerged rocks) or if free, with tightly inrolled lobes, usually with perithecia that look like black dots on the upper surface and bulges underneath ..... *Dermatocarpon*
- 10b. Thallus umbilicate, with broad lobes, tan to brown or olive in color, usually with distinctive apothecia that are dark in color with concentric rings ..... *Umbilicaria phaea*
- 11a. Thallus either appearing fruticose, with relatively narrow lobes that are yellow-green with white undersides, OR a very bright yellow ..... 12
- 11b. Thallus a shade of olive, brown, gray, blue-green, green or white ..... 13
- 12a. Thallus with relatively narrow lobes, pale yellow-green on upper surface with a whitish lower surface ..... *Evernia prunastri*
- 12b. Thallus bright yellow, lacking soredia but usually with brown apothecia ..... *Vulpicida canadensis*
- 13a. Thallus with veins on undersurface radiating towards the lobe tips (inspect closely, difficult to see in one sp.), often with abundant rhizines and often large in size overall ..... *Peltigera*
- 13b. Undersurface of thallus mottled or uniform but without distinct veins, size various ..... 14
- 14a. Undersurface of thallus mottled with bare patches AND tomentum, thallus usually large overall ..... *Lobaria pulmonaria*
- 14b. Undersurface not mottled with bare patches but possibly of more than one color, thallus size various ..... 15
- 15a. Thallus tan, brown, blackish, or olive on upper surface ..... 16
- 15b. Thallus a shade of white, gray, blue, or blue-green ..... 18
- 16a. Thallus dark brown to olive blackish, nearly fruticose, with only older portions of branches flattened, overall size very small (less than 3 cm across) ..... *Kaernefeltia merrillii*
- 16b. Thallus with coloration various but if dark as above then always more distinctly foliose, usually larger overall ..... 17

- 17a. Thallus always with at least lobes ascending from substrate, sometimes erect and loosely attached, upper and lower surfaces similarly colored, rhizines few or lacking, often with marginal pycnidia (appearing as dark bumps) or pseudocypbellae, never with whitish papillae or apothecia on lower surface ..... *Tuckermannopsis*
- 17b. Thallus flat to ascending, if ascending, with apothecia on undersides of lobe tips and commonly with whitish papillae on undersurface, no pycnidia or pseudocypbellae ..... 18
- 18a. Rhizines lacking (though tomentum occasionally present), apothecia on lower surface of lobe tips which often curve upwards, thallus often mousy brown and with whitish papillae surrounded by tan tomentum on undersurface ..... *Nephroma*
- 18b. Rhizines present, apothecia and thallus various ..... 19
- 19a. Upper surface of thallus brown to olive, isidiate, usually on bark ..... *Melanelia exasperatula*
- 19b. Upper surface of thallus some shade of white, gray, or blue-green ..... 20
- 20a. Lobes inflated, hollow inside, thallus whitish to greenish-gray, undersurface black and usually wrinkled ..... *Hypogymnia*
- 20b. Lobes not inflated and hollow, thallus color various ..... 21
- 21a. Thallus mostly appressed, usually with angular whitish markings on upper surface, lower surface always black with many rhizines ..... *Parmelia*
- 21b. Thallus ascending to erect or pendant, often large, lobes narrow to wide, undersurface black, tan, or white or a combination of these colors, rhizines few, often on bark or wood ..... *Platismatia*

## KEY TO SPECIES WITHIN GENERA

### *Alectoria*

- 1a. Thallus short, tufted, with short bumps (spinules) along branches that appear to be isidia, less common ..... *A. imshaugii*
- 1b. Thallus long pendant, usually on bark or wood, lacking spinules, very common ..... *A. sarmentosa*

### *Bryoria*

(Note: Chemical tests are needed for positive identification. See McCune and Geiser (1997)).

- 1a. Thallus pale grayish to greenish brown, apothecia rare, pseudocypbellae elongate and whitish, branches very fine ..... *B. capillaris*

- 1b. Thallus chestnut to dark brown, pseudocyphellae various ..... 2
- 2a. Thallus long pendant and often olivaceous, common in middle to high elevation, cool forests, pseudocyphellae white in color and usually abundant ..... *B. pseduofuscescens*
- 2b. Thallus sorediate, pseudocyphellae few to none, if lichen is abundant then usually in relatively dry *Pinus* and *Pseudotsuga* forests. .... 3
- 3a. Thallus pendant but short (generally to 15cm), with whitish soralia, and with angles between the branches v-shaped, branches fine, to 0.4 mm in diameter, thallus never forming large clumps ..... *B. fuscescens*
- 3b. Thallus often long-pendant, to 50 cm, with occasional yellow soredia, often forming thick masses in dry forests or open habitats ..... *B. fremontii*

### *Cladonia*

*Note: This genus requires chemical and other tests for proper identification, see McCune and Geiser (1997).*

- 1a. Apothecia at top of podetia red, podetia sorediate ..... 2
- 1b. Apothecia brown or lacking ..... 3
- 2a. Podetia to 4 cm tall, to 2.5 mm in diameter, with cortex visible or completely covered with powdery to granular soredia ..... *C. transcendens*
- 2b. Podetia large, to 8 cm tall and with irregular cups, to 5 mm in diameter, completely sorediate, overall with a distinct yellowish cast, generally larger than above ..... *C. sulphurina*
- 3a. Podetia ending in large deep cups, with small squamules and granules inside them ..... *C. pyxidata*
- 3b. Podetia ending in narrow cups, often poorly formed, squamules relatively large (3-8 mm in diameter) ..... *C. ochrochlora*

### *Dermatocarpon*

- 1a. Thallus grass green when wet, growing on periodically submerged rocks, thallus usually appearing broadly attached, **sensitive** ..... *D. luridum*
- 1b. Thallus remaining brown when wet, on dry rocks with a single holdfast or unattached and rolling freely in dry areas ..... 2
- 2a. Undersides of thallus (or interiors of tightly rolled lobes of the thallus of vagrant forms) with distinct papillae, generally invisible to the naked eye but seen with a hand lens ..... *D. reticulatum*
- 2b. Undersides of thallus (or lobe interiors, as above) smooth or with some texture, but lacking papillae ..... *D. miniatum*

## *Hypogymnia*

- 1a. Interiors of lobes white (or with very pale gray floor) on upper and lower surfaces (check carefully, the very tips of lobes of other *Hypogymnia* spp. can appear almost white on both surfaces) ..... *H. imshaugii*
- 1b. Lobe interiors various, often white on upper surfaces and black below, but never completely white ..... 2
- 2a. Soredia lining inside of lobe tips, which burst open, often forming lip shaped structures ..... *H. physodes*
- 2b. Soredia absent or on outside of expanded lobes, never inside ..... 3
- 3a. Soredia covering outsides of enlarged lobe tips, lobes narrow and erect ..... *H. tubulosa*
- 3b. Soredia absent, lobes appressed, thallus generally small .. *H. metaphysodes*

## *Leptogium*

- 1a. Lower surface tomentose with a mat of white hairs, upper surface slate gray and with minute white hairs (these hairs on the upper surface are diagnostic for the variety), **sensitive** ..... *L. burnetiae* var. *hirsutum*
- 1b. Lower surface smooth or wrinkled but lacking a mat of white hairs (occasionally with a few tufts of attachment hairs), upper surface blue-gray, **sensitive** ..... *L. cyanescens*

## *Nephroma*

- 1a. Lower surface with tomentum (especially near lobe tips) and with scattered pale bumps visible amid tomentum ..... *N. resupinatum*
- 1b. Lower surface smooth, almost always completely lacking all tomentum, always lacking bumps, **sensitive** ..... *N. bellum*

## *Nodobryoria*

- 1a. Thallus in short tufts on bark or wood, often mingling with other lichens, apothecia very common ..... *N. abbreviata*
- 1b. Thallus generally longer-tufted to pendant, apothecia sometimes seen ..... *N. oregana*

## *Parmelia*

- 1a. Isidia lacking, soredia present, on angular cracks of upper surface, powdery, at least some rhizines squarrosely branched ..... *P. sulcata*
- 1b. Isidia present, soredia absent, rhizines simple or with some dichotomous branching at apex ..... 2

- 2a. Isidia dull (because of noncontiguous cortex), sometimes appearing coarsely granular, not concentrated at margins, usually on bark or wood ..... *P. hygrophila*
- 2b. Isidia shiny (corticate), often elongate and branched ..... 3
- 3a. Isidia tending to be concentrated on margins of lobes, lobes relatively long and narrow, most commonly on bark or wood ..... *P. pseudosulcata*
- 3b. Isidia evenly distributed, often on rock, or on soil or moss over rock ..... *P. saxatilis*

### ***Peltigera***

- 1a. Thallus bright green when wet ..... 2
- 1b. Thallus grayish, brown, blackish, or olive when wet ..... 4
- 2a. Thallus very small (to 2 cm), apothecia relatively large dark brown horizontal disks, the veins on the undersurface dark ..... *P. venosa*
- 2b. Thallus larger, apothecia more vertical, not in same plane as thallus .... 3
- 3a. Dark dots (cephalodia) on surface easily flicked off with fingernail (they are raised above the thallus with edges slightly free) ..... *P. britannica*
- 3b. Cephalodia sunken or level with surface of thallus, not easily taken off with fingernail ..... *P. aphthosa*
- 4a. Soredia present on lobe margins, veins sometimes indistinct and difficult to see ..... *P. collina*
- 4b. Soredia absent, veins usually distinct ..... 5
- 5a. Lobules (small lobes with the same appearance as the rest of the thallus) present at lobe margins and along cracks in the upper thallus ..... 6
- 5b. Lobules absent ..... 7
- 6a. Upper surface dull, with tomentum at lobe tips ..... *P. praetextata*
- 6b. Upper surface smooth, lacking tomentum, **sensitive** ..... *P. pacifica*
- 7a. Apothecia distinctly black, on upturned lobe tips, upper surface shiny and smooth with tips of lobes pruinose, **sensitive** ..... *P. neckeri*
- 7b. Apothecia red-brown, upper smooth but lobe tips thinly tomentose, thallus very thin ..... *P. membranacea*

### ***Platismatia***

- 1a. Lobes relatively broad (5 to 25 mm), soredia or soredia and isidia usually present, large and scruffy-looking common lichen ..... *P. glauca*



- 1b. Lobes more narrow, thallus tufted to somewhat pendant, soredia never present ..... 2
- 2a. Isidia present on lobe margins, thallus sometimes drooping off the substrate ..... *P. herrei*
- 2b. Isidia lacking, dark marginal pycnidia sometimes present ..... *P. stenophylla*

***Tuckermannopsis***

- 1a. Lobes channeled, with marginal soredia that are often lighter than the thallus ..... *T. chlorophylla*
- 1b. Lobes relatively broad, upper surface warty and wrinkled, often with pycnidia ..... *T. platyphylla*

***Usnea***

- 1a. Isidia possible, no soredia, with papillose branches ..... *U. filipendula*
- 1b. Soredia present, soralia concave in shape ..... 2
- 2a. Isidia lacking but soredia present, soralia very concave, often exposing the central cord and wrapping around branches, the edges flared outwards ..... *U. lapponica*
- 2b. Isidia and soredia present, soralia concave but not usually exposing central cord ..... *U. substerilis*

## *Alectoria imshaugii*



**Characteristics:** A key feature is that the branches have many tiny spinules that look like isidia. Found infrequently in very moist habitats, on wood.

**Notes:** This lichen is not as common as *A. sarmentosa*, and probably never attains the same biomass. It is relatively small, and looks similar to an *Usnea*. A lack of a central cord and the many spinules help to identify this species.

## *Alectoria sarmentosa*



**Characteristics:** This lichen has whitish pseudocyphellae and can be very long pendant. Mainly on bark or wood, it is an old-growth associate.

**Notes:** Very common in moist drainages and in cool moist or subalpine fir forests. The thallus is flexible, especially when wet. Identification with absolute certainty requires a chemical test, see McCune and Geiser (1997).

*Bryoria capillaris*



**Characteristics:** A relatively small, very pale *Bryoria*, it is usually pale gray or tan with fine branches. With pseudocyphellae but rarely apothecia.

**Notes:** Locally common but infrequent overall, this lichen is found in moist mid-elevation forests on the Umatilla. The thallus is usually not large and this species seems to occur mostly with other *Bryoria* spp. Chemical tests are needed for positive identification, as pale forms of other species exist.

*Bryoria fremontii*



**Characteristics:** Often long filamentous, this lichen usually lacks soredia, pseudocyphellae, and apothecia. The branches are uneven in diameter.

**Notes:** Can be very abundant in *Pinus* or *Pseudotsuga* forests, especially at middle elevations, and is also in cool dry types. On the southern districts it is increasingly restricted to drainages. As with all *Bryoria* spp., positive identification requires chemical tests.



## *Bryoria fuscescens*



**Characteristics:** V-shaped branch angles and occasional soralia distinguish this species. It tends to be medium-sized overall and to lack apothecia.

**Notes:** This lichen is never as abundant as *B. fremontii*, but is still fairly common, especially in grand fir forests. Hold it at arm's length to see the branching, and be aware that *B. glabra* has U-shaped branching.

## *Bryoria pseudofuscescens*



**Characteristics:** This lichen usually has whitish pseudocyphellae and can become very long pendant and abundant. Apothecia are rare.

**Notes:** Look for this one particularly in cool moist and subalpine forest types, as it tends to dominate in more moist settings than *B. fremontii*. Pale forms of this lichen can look similar to *B. capillaris*.

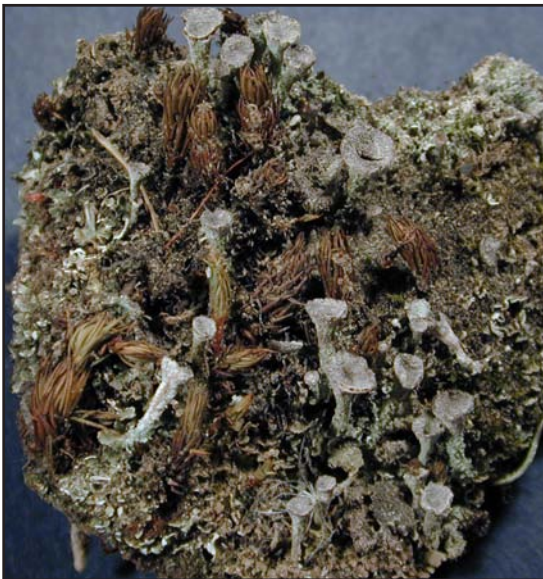
## *Cladonia ochrochlora*



**Characteristics:** Large, generally entire to slightly dissected lower squamules and podetia with poorly formed cups are key characters.

**Notes:** This *Cladonia* occupies a wide range of habitats and is usually found on rotten wood. It is important to note that identification of species in this genus requires chemical and other tests, and should not be based on morphological features alone.

## *Cladonia pyxidata*



**Characteristics:** The deep, wide cups lined with small squamules and granules and the granular to nearly squamulose exteriors of podetia characterize this species.

**Notes:** This lichen can be found primarily on soil or moss over soil, and is seen in rocky sites as well as disturbed areas. It is more often found in exposed areas than the other *Cladonia* spp. on the Umatilla. This specimen is from a highly exposed site and is more brownish than normal. Shade forms are pale green.



## *Cladonia sulphurina*



**Characteristics:** The YELLOWISH podetia with irregularly formed cups and red apothecia (the small red apothecial initials are shown here) help to distinguish this species.

**Notes:** Found on wood or soil, this species is most common in cool forests. *C. transcendens* can also have a yellowish cast when growing in exposed sites, but has much smaller and more narrow podetia and is not UV+.

## *Cladonia transcendens*



**Characteristics:** This species has bright red apothecia which often appear on irregular cups. The podetia are sorediate (occasionally squamulose) and this character especially helps to distinguish the species.

**Notes:** This beautiful lichen occurs only occasionally on the Umatilla. It will be found on wood or bark, usually only in very moist forest settings, especially near drainages. This particular specimen has larger squamules than most. When found in part sun, the podetia will appear more yellowish than pictured above.



Image courtesy of Stridvall Plant Galleries (<http://www.stridvall.se/la/galleries.php>)

### *Sensitive*

**Characteristics:** An in-stream aquatic foliose lichen, usually from 3 mm to 2 cm broad. Drab brown when dry, this lichen is a brighter green when wet. The upper surface is generally smooth to slightly wrinkled, and may have small black dots from the perithecial openings. The lower surface is dark brown with occasional paler patches, mostly smooth, but with occasional roundish bulges from the perithecia. The thallus is more or less umbilicate, though it tends to appear more broadly attached than other members of the genus.

**Notes:** This species grows on rock in stream beds, seeps, lake margins, and waterfalls, and can be found in forested habitats or in streams in meadows or other openings. It can withstand some fluctuation in water level and some amount of desiccation, but is always submerged for a portion of the year.

**Look-alikes:** Other species of *Dermatocarpon* and potentially members of the genus *Umbilicaria* could be confused with this taxon upon initial observation. The semi-aquatic habitat of this taxon and the overall appearance of multiple, stacked individuals that are broadly attached are key features. While other species of *Dermatocarpon* and *Umbilicaria* can be found on rock that is wetted by water, none are typically submerged much of the year. *Dermatocarpon rivulorum* occupies similar habitats, but has a veined and shiny undersurface.

## *Dermatocarpon miniatum*



**Characteristics:** The major distinguishing feature for this species is the smooth lower surface (use a hand lens). *D. reticulatum* is very similar but has a lower surface with small papillae.

**Notes:** Both of these *Dermatocarpon* species have two distinct forms. The common form is a flat, umbilicate thallus attached to rock, usually a tan color (above photo). The other form is a "vagrant" in which the lobes are tightly rolled to create a nearly round overall thallus, similar overall to the image at right. The flat form is most easily confused with other *Dermatocarpon* species or with species of *Umbilicaria*. Look for the tiny black dots on the surface (the openings of perithecia), which indicate *Dermatocarpon*, then check for the smooth undersurface to be sure of the species. *Umbilicaria* species lack perithecia but can have larger, dark apothecia on the upper surface. This lichen can be found on rock surfaces, especially on somewhat sheltered crevices or on rocks that are partly shaded. The vagrant form can be found on scabland sites, especially in flatter areas that become temporarily flooded.



## *Dermatocarpon reticulatum*



**Characteristics:** Very similar to *D. miniatum*, this species also can be found with two body forms and occurs in similar habitats. However, this species has a finely papillose undersurface, which can be seen with a hand lens. The pyramidal papillae have an appearance somewhat like coarse sandpaper.

**Notes:** Both forms of this lichen tend to occupy similar habitats as *D. miniatum*, and the two are often confused. The papillose lower surface is the key feature of this species.

## *Evernia prunastri*



**Characteristics:** This lichen has an upper surface of yellow green and a whitish undersurface (lower cortex), so it is technically foliose, even though it has narrow lobes. This coloration difference is distinctive.

**Notes:** This lichen is especially common along drainages, even in warm and dry forest settings. Although it is common, at times it grows relatively high in the canopy and may first be encountered as litterfall.

## *Hypogymnia imshaugii*



**Characteristics:** This lichen is variable in appearance and can be appressed or erect, but will always have white lobe interiors (sometimes the floor appears slightly grayish). The more common erect form is pictured.

**Notes:** Be sure to check several lobes, since the very young lobe tips of other *Hypogymnia* species can appear to have white interiors also. This one is common on bark and wood in dry habitats to *Abies grandis* forest types.

## *Hypogymnia metaphysodes*



**Characteristics:** This appressed lichen lacks soredia and usually has pale lobe ceilings. It often has short side-lobes along the lobes.

**Notes:** Found on bark and wood in moist forests, this lichen is not common on the Umatilla. Look for it especially along drainages in cool, moist forest types.



**Characteristics:** The key feature for this species is that the soredia are produced on the insides of the lobe tips, which then burst open and often form lip-shaped structures, which are lighter in color in the above image. Once seen, these are distinctive and provide for easier identification.

**Notes:** This species is very common on the Umatilla and is normally found on bark or wood. It is present in a wide range of habitats, from dry shrubland or grassland habitats (especially along drainages) to moist forest settings.



## *Hypogymnia tubulosa*



**Characteristics:** The swollen lobe tips covered with powdery soredia are key characters of this taxon. In contrast to the exploded lobe tips of *H. physodes*, the lobe tips of this species are entire and simply covered with soredia

**Notes:** Relatively common on bark or wood in many habitats (especially moist ones), this taxon looks similar to a much rarer *Hypotrachya* that has many slender rhizines on the lower surface.

## *Kaernefeltia merrillii*



**Characteristics:** A very small lichen (usually around 2cm, this one is slightly over 1 cm) that is dark olive to black in color. Some lobes are finely dissected.

**Notes:** Tends to occur in dry, open habitats on conifer bark or wood. This small dark lichen is easily overlooked and can be covered over by *Nodobryoria abbreviata* (there is still some on the left in this picture).



*Sensitive*

**Characteristics:** A foliose lichen with a distinctively slate gray, relatively smooth to slightly wrinkled upper surface. Sheltered lobes (at least) are distinctly grayish on the upper surface, and at least part of the upper surface is covered in short, whitish hairs. The mature isidia are cylindrical or branched. The lower surface is distinctly white tomentose, and when broken, the thallus is uniformly dark in color at 20x. The tips of the lobes are naked or only moderately hairy.

**Notes:** This lichen is typically found growing on the bark of trees but can also be found on decaying logs, mosses, and on rock. It requires a relatively high level of humidity and is most likely to be encountered in riparian zones.

**Look-alikes:** *L. burnetiae* var. *hirsutum* is most likely to be confused with other members of the genus *Leptogium* that have a tomentose lower surface and with *Leptochidium*. When dry, the thallus is a slate gray with cylindrical or branched isidia, and lacks an olive tint and granular or globular isidia as seen in *L. saturninum*. The upper surface is gray and smooth, rather than brownish tinted and wrinkled, as in *L. pseudofurfuraceum*. Superficially, *Leptochidium albociliatum* also resembles *L. burnetiae* var. *hirsutum*, but has stiff white hairs on the lobe margins. *Leptochidium* also has definite algal and medullary layers in the thallus, so that when broken, there is a thin middle layer that is light in color, visible with a hand lens. A broken edge of *Leptogium* will be dark throughout.

## *Leptogium cyanescens*



Image courtesy of Stridvall Plant Galleries (<http://www.stridvall.se/la/galleries.php>)

### **Sensitive**

**Characteristics:** A foliose lichen with a bluish-gray upper surface (when dry) and a lower surface either naked or with scattered tufts of hairs, but not distinctly woolly. The thallus is 1-5 cm in diameter, and more or less flat. The upper surface has smooth lobes 2-4 mm across. There are often abundant cylindrical isidia and/or lobules over the upper surface.

**Notes:** This lichen is found on the bark of trees (often larger and older individuals), rotten logs, and rocks. It requires a relatively high humidity and is most likely to be found in riparian zones.

**Look-alikes:** Most likely to be confused with other members of the genus that lack a strongly tomentose undersurface, the slate gray color when dry, smooth lobes with broadly rounded to somewhat toothed margins, and cylindrical to flattened isidia are distinguishing. *L. subaridum* has similar isidia, but the thallus is brownish or blackish and usually more wrinkled, and the lobe margins are more finely dissected. *L. lichenoides* is an example of a member of the genus that has finely dissected lobe margins (image below).



*L. lichenoides*, image courtesy of Stridvall Plant Galleries (<http://www.stridvall.se/la/galleries.php>)



*Letharia vulpina*



**Characteristics:** A bright yellow-green thallus and the presence of soredia or isidia distinguish this species. Apothecia are rare.

**Notes:** This species is common on wood or bark, especially on snags. It is most often found in *Pinus ponderosa* or *Pseudotsuga menziesii* forests or open areas in other habitats. Not found in dense, moist forest settings. The similar *L. columbiana* lacks soredia or isidia but usually has apothecia.

*Lobaria pulmonaria*



**Characteristics:** The undersurface often has bare patches (white patches, above) and tomentum, and the upper surface is deeply ridged, with soredia on the surface and on the margins. It is more green when wet than dry.

**Notes:** Fairly common on trees or shrubs and mossy rock in moist riparian areas, *L. pulmonaria* is an old-growth associate. Check carefully for the key characters--other *Lobaria* species are similar but rare east of the Cascades.

## *Melanelia exasperatula*



**Characteristics:** An olive-colored thallus with a tan to dark, often mottled, lower surface and bulbous isidia are identifying characters for this species.

**Notes:** Found on bark and wood, this lichen can occupy a wide range of habitats. It is very difficult to distinguish this species from other members of the same genus, and expert assistance may be needed.

## *Nephroma resupinatum*



**Characteristics:** This lichen has a gray-brown thallus with a characteristic undersurface with whitish papillae surrounded by tan tomentum. The upper surface is pubescent.

**Notes:** Very common on bark and rock in moist forests or near rivers, this lichen often has apothecia on the undersides of the lobe tips (as seen above).





*Sensitive*

**Characteristics:** A foliose, loosely appressed to ascending lichen to approximately 8 cm in diameter. The upper surface is light to dark brown, and the lower is tan to brown and naked to pubescent. This lichen lacks isidia, soredia, and marginal teeth on the lobes. The medulla is white.

**Notes:** Often found on hardwoods in riparian areas, *N. bellum* requires high humidity and is associated with stands older than 140 years. It has been found on the eastside associated with yew at lower elevations (below 3000 ft.). It can also be found on mossy rocks.

**Look-alikes:** While *N. bellum* is similar in appearance to other species in the genus, the complete lack of isidia, soredia, marginal teeth on the lobes, and papillae help to distinguish it. *N. laevigatum* differs in that it has a yellow medulla, rather than white as in *N. bellum*.

### *Nodobryoria abbreviata*



**Characteristics:** Thallus is tufted, not usually long-pendant, and a red-brown color. Apothecia are very commonly seen in this species.

**Notes:** Relatively common on branches in relatively dry, open forests, especially near drainages or in the northern half of the Umatilla. It is often seen mixed with other lichens (here with *Hypogymnia*).

### *Nodobryoria oregana*



**Characteristics:** Thallus reddish brown and long-pendant, often with short side-branches along main ones. Apothecia are sometimes present.

**Notes:** The reddish-brown color (when dry) helps to distinguish this from *Bryoria* species. Usually on conifers in very moist sites, it is often mixed with *Alectoria* (as shown) and *Bryoria* species.

### *Parmelia hygrophila*



**Characteristics:** The surface of this species has dull isidia which look somewhat more like coarse soredia, and the lobe tips usually have the pale angular markings typical for *Parmelia*. The rhizines are simple.

**Notes:** Found on bark and wood in a range of moist habitats, this species is occasionally seen on the Umatilla. The isidia can look like very coarse soredia--check carefully with a dissecting scope.

### *Parmelia pseudosulcata*



**Characteristics:** A species with relatively narrow lobes and shiny isidia which tend to be concentrated toward the lobe margins.

**Notes:** This *Parmelia* is usually found on bark or wood in moist forests. It tends to have more narrow lobes than other *Parmelia* species on the Umatilla.



## *Parmelia saxatalis*



**Characteristics:** This *Parmelia* has shiny isidia on the surface and on the margins, and has pale angular markings towards the lobe tips.

**Notes:** This species is most often found on rock or soil or mosses over rock in a range of conditions. This substrate difference helps to distinguish it from other isidiate *Parmelia* species. It is seen occasionally on the Umatilla.

## *Parmelia sulcata*



**Characteristics:** This *Parmelia* lacks isidia but does have soredia both on the margins and along the angular cracks on the upper surface. The rhizines towards the center of the thallus are also squarrosely branched.

**Notes:** *P. sulcata* is normally found on bark or wood in a wide range of habitats. It is occasionally seen on the forest. The soredia and the squarrose rhizines distinguish it from other *Parmelia* species of the Umatilla.

## *Peltigera aphthosa*



**Characteristics:** This lichen is a bright green color when wet. It has round dark spots (cephalodia) on the surface which are flat or slightly sunken and not easily removed with a fingernail.

**Notes:** Usually found on soil, humus, or mossy rocks in a range of habitats, from roadcuts and talus (but usually in cool, mid- to upper elevations) to moist forests. It intergrades with *P. britannica*.

## *Peltigera britannica*



**Characteristics:** Another *Peltigera* that is bright green when wet, this species has dark cephalodia that are raised and are easily flicked off with a fingernail.

**Notes:** This species is found in similar habitats as *P. aphthosa* but seems also to occur in slightly more mesic conditions, especially on the forest floor in mid-elevation cool forests. It intergrades with *P. aphthosa*.



## *Peltigera collina*



**Characteristics:** A small to medium sized, gray to brown thallus with sorediate margins characterize this *Peltigera*. The veins on the undersurface can be very difficult to see and are occasionally nearly lacking (left, above).

**Notes:** This lichen is usually found on mossy rock, but is epiphytic closer to the coast. The sorediate margins distinguish it from other *Peltigera* species, but the indistinctness of the veins may cause some initial confusion.

## *Peltigera membranacea*



**Characteristics:** Thallus is generally large and brownish, and the lobe margins are generally downturned. The veins are very distinct and have a fine tomentum, as do the long, simple rhizines. The apothecia are on narrow lobes.

**Notes:** This lichen occurs on moss, soil or rotten logs. Similar to *P. praetextata*, this species has tomentum on the veins.



*Sensitive*

**Characteristics:** This *Peltigera* is glabrous and lacks soredia, isidia, and lobules. The thallus is mid-sized, with lobes less than 2 cm wide. The apothecia are more or less vertical on upright lobes and are a dark brown to black color. The lower surface has wide, low, dark veins that contrast with the lighter background. Occasionally the veins are few, and they may fade significantly toward the lobe tips. The upper surface is dark gray when wet and generally glossy, occasionally with somewhat pruinose margins.

**Notes:** *P. neckeri* grows on many substrates, including mossy logs, tree bases, rocks, and soil. It is usually associated with moist coniferous forests and often with older stands.

**Look-alikes:** Forms of *P. collina* that lack soredia can be mistaken for *P. neckeri*, but the shiny upper surface, dark apothecia, and pruinose lobe tips should distinguish this rare taxon.

## *Peltigera pacifica*



### *Sensitive*

**Characteristics:** This foliose lichen has a relatively shiny upper surface that is dark grayish or brownish. The lobes are rounded and 0.5-1.5 cm broad, and the margins are sometimes upturned and generally covered with abundant lobules, which may also develop on cracks in the thallus. There are no soredia or isidia. The apothecia are red-brown and occur on the tips of the lobes. The lower surface is pale to dark in the center, and the veins are low to somewhat raised near the center, dark but paler near the margins, and broad. The rhizines are 3-7 mm long.

**Notes:** This lichen can occur on soil, moss, logs, and tree bases, and again prefers moist environments.

**Look-alikes:** The lobulate margins distinguish *P. pacifica* from most other members of the genus in its range. *P. elizabethae* is lobulate, but has strongly confluent and indistinct veins on the lower surface.



*Peltigera praetextata*



**Characteristics:** Very similar to *P. membranacea*, this species usually has upturned lobe margins and may have lobules on the margins or on cracks in the upper surface. It also has little to no tomentum on the veins.

**Notes:** Found on soil or mosses on the forest floor or on rotten logs in a range of habitats, from clearcuts to moist forests. It is seen most commonly in the northern districts.

*Peltigera venosa*



**Characteristics:** A very small lichen (to 2 cm in diameter), this species has apothecia that are in the same plane as the thallus, which is bright green when wet (gray-green when dry, as pictured). It has the veins on the undersurface that are characteristic of the genus.

**Notes:** Found on moist soil, sometimes in disturbed areas, this lichen is relatively common yet easily overlooked because of its small size.

*Platismatia glauca*



**Characteristics:** A scuffy-looking lichen with a blue-green to whitish or grayish upper surface and a lower surface that is white, brown, or black, or a combination of these colors. Soredia or soredia and isidia are present.

**Notes:** Very common and abundant in moist forests, usually on bark or wood, this lichen is one of the most common on the Umatilla. The wide-lobed, scuffy shape and the presence of soredia are key characters.

*Platismatia herrei*



**Characteristics:** Thallus is drooping, gray to green; lower surface is white, black, and/or brown. Shiny isidia are present, mostly on the lobe margins.

**Notes:** Uncommon in very moist forests on bark or wood, this lichen is distinguished by its narrow lobes and the presence of isidia on the margins. It is most commonly found on litterfall along moist riparian areas.



**Characteristics:** This is a tufted lichen with a white to gray to greenish upper surface and a lower surface that is white, brown, black, or a combination of these colors. It lacks soredia and isidia but usually has dark marginal pycnidia and often has apothecia.

**Notes:** Fairly common in very moist forests, especially near drainages, *P. stenophylla* looks similar to *P. herrei*, as they both have narrow lobes. However, *P. stenophylla* lacks the marginal isidia that is found on the other species. Also, well-developed specimens of this species tend to be semi-erect, stiffly bushy forms, while *P. herrei* is more often somewhat lax and drooping.



## *Ramalina farinacea*



**Characteristics:** The thallus is tufted to drooping, relatively stiff, and a yellow-green color. There are whitish soredia, mainly on the margins.

**Notes:** This lichen is seen occasionally on bark or wood in moist habitats, often near drainages. It is easy to overlook because of its relatively small size (less than 10 cm, those pictured above are mostly around 5 cm), and its similarity in color to an *Usnea*.

## *Tuckermannopsis chlorophylla*



**Characteristics:** The marginal soredia (often whitish) are diagnostic. Coloration varies from tan or olive in shaded sites to brown in the sun.

**Notes:** *T. chlorophylla* is found in many habitats, almost always on bark or wood. Though this lichen is variable, the sorediate margins distinguish it from other species. A shaded specimen is pictured above.



**Characteristics:** This lichen has a very warty surface and varies in color from olive-brown, usually in the shade, to dark brown in exposed sites. The lower surface is tan to dark brown. The pycnidia are on the surface and on the margins, and apothecia are common.

**Notes:** Mainly on conifers in dry environments, this lichen is very common on the Umatilla. It is often on the upper surfaces of low branches with *Hypogymnia* spp. and the occasional *Bryoria*. Old litterfall specimens or ones in highly exposed areas are often crumbly and very dark brown or black. Shade forms can be confused with *T. orbata*, consult McCune and Geiser (1997) if the pycnidia are mainly marginal instead of being marginal and laminal.

## *Umbilicaria phaea*



**Characteristics:** An umbilicate lichen with a brown upper surface and a dark, papillose or warty lower surface, rarely with a few rhizines. There are dark, distinctive apothecia on the upper surface--these have concentric rings.

**Notes:** This lichen is found occasionally on rock in exposed to partly shaded habitats. This lichen may be confused with *Dermatocarpon* species, however, the apothecia with distinct rings are a reliable feature of *U. phaea*. A variety of this species is bright red and has been found in central Oregon and Washington.



## *Usnea filipendula*



**Characteristics:** A long-pendant thallus with branches that have a whitish central cord, often with short, thin fibrils projecting from the branches at right angles. The main branches are also often papillose, and isidia are sometimes present.

**Notes:** This taxon is currently not well defined and is referred to as the *U. filipendula* group. It is found occasionally in moist forests on bark and wood.

## *Usnea lapponica*



**Characteristics:** This lichen is tufted with branches that often have many short fibrils. Isidia are absent, but soredia are present. The soralia are so deeply concave that they often expose the central cord, and the edges flare out and curl back.

**Notes:** Seen occasionally but probably relatively common on bark or wood in a range of habitats, this lichen is not restricted to moist environments. The highly concave soralia are a key feature in this species.

## *Usnea substerilis*



**Characteristics:** Similar to *U. lapponica*, with branches that have fibrils and concave soralia. However, the soralia usually do not expose the central cord and this species has isidia in addition to the soredia.

**Notes:** This species is also seen occasionally in a variety of habitats, but often near drainages. It is very similar to *U. lapponica*, and a close examination of the soredia and isidia is needed for proper identification.

## *Vulpicida canadensis*



**Characteristics:** A relatively small bright yellow lichen, commonly with brown apothecia, this species lacks soredia. It has relatively wide, ascending lobes and is normally less than 4 cm wide overall.

**Notes:** A very common lichen in a range of habitats. It is usually seen on bark or wood of *Pinus*, *Pseudotsuga*, and *Larix*, but can be found elsewhere. It is often in semi-open areas, especially near drainages. The bright yellow thallus which has apothecia but lacks soredia is distinctive.



## KEY TO BRYOPHYTE SPECIES

*Note: This key is for species presented in this guide only.*

- 1a. Plant either flat and leaflike, generally with lobes at least a centimeter wide; or plant with definite leaves, these without a costa (midrib), often folded, relatively small and delicate (liverworts) ..... 2
- 1b. Plants either erect or creeping, always with distinct stems and leaves, leaves often with a costa, plants usually more substantial than above (mosses) ..... 5
- 2a. Body flat and leaflike (thallose liverworts) ..... 3
- 2b. Body with distinct leaves (leafy liverworts) ..... 4
- 3a. Plants relatively large and robust, with lobes at least two centimeters wide, often with gemmae cups on upper surface of thallus or umbrella-like reproductive structures on stalks above thallus, no distinct pores on the surface that are clearly visible with naked eye, often common on soil after fires, even in dry habitats ..... *Marchantia polymorpha*
- 3b. Robust plants of wet places, especially banks of slow streams, with distinct whitish pores on surface ..... *Conocephalum conicum*
- 4a. Leaves folded, entire to only slightly dissected ..... *Porella cordaeana*
- 4b. Leaves well dissected into fine, eyelash-like segments ..... *Ptilidium pulcherrimum*
- 5a. Plants often not green, generally whitish green to yellowish to red, branches in clusters and often forming a round ball at the apex, cells of leaves with narrow green cells alternating with large, hyaline cells ..... *Sphagnum squarrosum*
- 5b. Plants of various colors but nearly always green to blackish, branches not in clusters, cell structure lacking distinct arrangement of above ..... 6
- 6a. Plants dendroid, with a tree-like appearance, the upright lower stem lacking branches ..... *Leucolepis acanthoneuron*
- 6b. Plants creeping or erect but not tree-like ..... 7
- 7a. Plants growing submerged or at the waterline, aquatic ..... 8
- 7b. Plants often in wet places but not truly aquatic ..... 10
- 8a. Plants generally very robust, growing submerged in rivers, usually sterile unless drying out, green to dark brown or black, stem and branch tips triangular, leaves to 6 mm, broadly ovate-lanceolate, costa lacking ..... *Fontinalis antipyretica*
- 8b. Plants small to medium sized, dark brown to black at base but with green shoot tips, usually on banks of flowing water, leaves with single strong costa ..... 9

- 9a. Plants with capsules with peristome, leaves bordered by 1-2 layers of cells in cross section ..... *Scouleria aquatica*
- 9b. Plants with capsules lacking a peristome, leaves distinctly bordered by more than two layers of cells in cross section, **sensitive** ..... *Scouleria marginata*
- 10a. Plants mostly made up of luminous protonema, the leafy shoots 2-10 mm tall, leaves lacking a costa and with basal portion joined to leaf below and thus fernlike, **sensitive** ..... *Schistostega pennata*
- 10b. Plants without luminous protonema, leafy portion conspicuous ..... 11
- 11a. Plants with main stems mostly creeping, usually with much branching, sporophytes on short side-branches off the main stem (pleurocarpus) .. 12
- 11b. Plants mostly upright, with few branches or branches lacking, sporophytes at tips of main stems (acrocarpus) ..... 28
- 12a. Costa lacking OR costa double, usually short but occasionally to middle of the leaf ..... 13
- 12b. Plants with a single, strong costa to the center of the leaf; sometimes with short, supplementary costa on either side of the main costa ..... 19
- 13a. Plants very common, relatively large and robust, irregularly branched, with plicate leaves and a definite double costa to at least the middle of the leaf ..... 14
- 13b. Plants typically smaller, variously branched, leaves typically not plicate and if double costa present then short, rarely to middle of the leaf ..... 15
- 14a. Plants with reddish stems lacking paraphyllia, tips of main stems with a distinct curl, leaves plicate, papillose ..... *Rhytidiadelphus triquetrus*
- 14b. Plants with stems covered with numerous, branched paraphyllia, branch tips curled or not, leaves plicate at base and often wrinkled above, not papillose ..... *Rhytidiopsis robusta*
- 15a. Plants branched sequentially on a yearly basis, so that a bare patch of stem occurs between each year's feathery growth, creating an ascending stair-step pattern overall; plants golden green and often found in large carpets on duff, soil, or rock ..... *Hylocomium splendens*
- 15b. Plants not branched in this manner, without bare patches of stem occurring between feathery branching regions ..... 16
- 16a. Plants relatively large, usually on trunks or branches of trees, branches of moss often stoloniferous; with complanate, undulate leaves 2.5-3.0 mm that have a long, serrate, narrow point; median and upper leaf cells long and narrow in shape ..... *Neckera douglasii*
- 16b. Plants smaller, leaves to 2.5 mm long only and not undulated, often with margins recurved, at least at the base ..... 17

- 17a. Plants tufted to pendant, 1-5 cm long overall, with branches becoming slender and threadlike, round and 0.5 mm wide. Leaf margins recurved near base, usually sterile ..... *Tripterocladium leucocladulum*
- 17b. Plants of various sizes but without distinctly threadlike branches ..... 18
- 18a. Leaves falcate-secund, 1.2-2.0 mm long, revolute (usually on both sides) to the middle of the leaf or higher, on rock or soil over rock, often forming large, golden-green mats ..... *Hypnum revolutum*
- 18b. Leaves often secund at apices, margins usually serrate at apex, not revolute, on rotten logs or bases of trees ..... *Herzogiella seligeri*
- 19a. Branches strongly julaceous (worm-like), leaves imbricate, stem leaves 2-3 mm long, with margins revolute nearly to the apex, apex serrate with sharp teeth, faint supplementary costa sometimes present along with strong main costa ..... *Antitrichia californica*
- 19b. Plants without above combination of characters, branches slightly if at all julaceous, one species with definite supplementary costa ..... 20
- 20a. Leaves with a distinct supplementary costa on one or both sides of the main costa ..... *Antitrichia curtispindula*
- 20b. Supplementary costae completely lacking ..... 21
- 21a. Plants with distinctive growth form, thallus partly tufted and suspending long pendant flagelliform branches which may be julaceous, leaves serrate to below the middle, NOT complanate or undulate, variable moss usually in large mats on tree branches along very moist drainages ..... *Isothecium myosuroides*
- 21b. Plants without this distinctive growth form ..... 22
- 22a. Plants with complanate and undulate leaves, stems with paraphyllia, often with many short flagelliform branches, branching also complanate ..... *Metaneckera menziesii*
- 22b. Leaves not both complanate and undulate, flagelliform branches lacking ..... 23
- 23a. Plants irregularly branched, leaves very strongly falcate-secund (sickle-shaped and curved to one side), plicate, 2.5-5.0 mm long, tapering to a long slender point, median leaf cells long and narrowly rectangular in shape, on rock, trees, duff ..... *Sanionia uncinata*
- 23b. Not as above, leaves not falcate-secund ..... 24
- 24a. Plants (when dry) with **upcurled** branches, plants shiny golden-green and irregularly branched, leaves strongly plicate, with elongate cells, basal cells of leaves also narrow (less than 10  $\mu$ ), often found sterile on rock ..... *Homalothecium nevadense*
- 24b. Plants not as above, if completely golden in color then very regularly pinnately branched and found in wet meadows ..... 25



- 25a. Plants golden to gold-green, with erect branches covered with paraphyllia, very regularly and distinctly pinnate, leaf cells papillose, median leaf cells relatively short-rectangular (less than 5:1), found only in wet meadows, boggy areas ..... *Helodium blandowii*
- 25b. Plants without erect habit, regular branching, obvious paraphyllia, and above characters ..... 26
- 26a. Plants green, leaves of stem distinctly different than leaves of branches (wider at base, long decurrent, and more long-acuminate), stem leaves usually widely spaced ..... *Eurhynchium praelongum*
- 26b. Plants of various colors, leaves of stem not strongly differentiated from branch leaves as above, stem leaves typically more dense ..... 27
- 27a. Leaves broadly ovate, acuminate, stem leaves 2-3 mm long, plants large, glossy yellow green, on soil in very wet habitats, often very near or partially in water ..... *Brachythecium frigidum*
- 27b. Leaves ovate but usually imbricate and somewhat secund (sickle-shaped), stem leaves to 1.5 mm long, plants small and forming mats with more or less julaceous branches ..... *Brachythecium collinum*
- 28a. Leaves complanate (usually contorted when dry) AND leaf margins with a border of elongate cells (*Roellia*, *Mnium*, *Plagiomnium*, and *Rhizomnium*) ..... 29
- 28b. Leaves not complanate, with or without bordered margins ..... 33
- 29a. Leaves entirely lacking teeth, obovate to more or less orbicular, leaves relatively glossy and noncontorted when dry, **sensitive** ..... *Rhizomnium nudum*
- 29b. Leaves with single or double teeth, at least in part ..... 30
- 30a. Leaves with a strong, multistratose border of 4 to 5 layers of elongate cells (these layers are seen in leaf cross section), teeth double at least on upper parts of leaves, on rotten logs or soil ..... *Mnium spinulosum*
- 30b. Leaf borders unistratose (one layer thick in cross section), teeth single ..... 31
- 31a. Leaves wrinkled (rugose) when wet or dry, median leaf cells quite long (to at least 100 microns) and thin-walled ..... *Roellia roellii*
- 31b. Leaves not rugose wet or dry (but possibly contorted when dry), median leaf cells less elongate (at most 70 microns) and with thicker cell walls ..... 32
- 32a. Leaves toothed to the base (or nearly so), teeth sharp, plants with strongly decurrent leaves, fertile stems erect and usually shorter, on moist soil ..... *Plagiomnium insigne*
- 32b. Leaves toothed about halfway or rarely almost entire, teeth blunt, plants with leaves not or slightly decurrent, on very wet soil, near streams or in bogs ..... *Plagiomnium ellipticum*

- 33a. Leaves with lamellae on the upper surface of the leaf, at least on the costa, either with more than 20 lamellae and hairy calyptrae OR lamellae on costa only and leaves bordered by long narrow cells ..... 34
- 33b. Leaves lacking lamellae, one species with bordered margins but all others without ..... 36
- 34a. Leaves undulate and with bordered margins, calyptrae not hairy ..... *Atrichum selwynii*
- 34b. Leaves not undulate, leaf margins not bordered, seta long and calyptrae very hairy, leaf with lamellae ..... *Polytrichum juniperinum*
- 35a. Erect plants on rotten wood with relatively broad, ovate leaves, prominent costae, and abruptly bent setae with cylindrical capsules having only 4 peristome teeth, **sensitive** ..... *Tetraphis geniculata*
- 35b. Plants lacking this combination of characters, without abruptly bent setae and the peristome teeth lacking or greater than 4 ..... 36
- 36a. At least basal leaf cells with sinuose, wavy walls, leaves 3.0-4.6 mm long with conspicuous hyaline points, plants dark green-brown to grayish, usually on rock ..... *Racomitrium lanuginosum*
- 36b. Leaf cells lacking sinuous walls, or if walls slightly sinuose, then leaves shorter, not as above ..... 37
- 37a. Plants tufted to matted, often dark green or brown below, either on rocks or on trees, never on humus, calyptra large, plicate and usually hairy, often falling but still found amongst branches, seta short and the capsule often appearing lateral because of continued growth of stem .... 38
- 37b. Plants not as above, if calyptra large then not hairy and plant with leaves usually greater than 3 mm and found on soil or rock, setae usually longer and capsules not usually apparently lateral ..... 39
- 38a. Plants on trees only, often large, leaves lanceolate and usually 4-6 mm long, setae usually less than 1.6 mm long, dioicous .. *Orthotrichum lyellii*
- 38b. On trees or rocks, smaller than above, leaves lanceolate, 3-5 mm, setae 1.5-2.8 mm, capsules exserted, autoicous ..... *Orthotrichum speciosum*
- 39a. Calyptra large (to 6.5 mm), with a lacerate or fringed base, shaped like a candle snuffer, leaves 3-6 mm long, oblong to lingulate, upper and median leaf cells papillose, on soil or soil over rock.... *Encalypta ciliata*
- 39b. Calyptra not large and shaped as above ..... 40
- 40a. Plants usually yellow-green, often with obvious asexual reproductive bodies borne on an elongate pseudopodium, found on highly organic, wet soil or rotting logs or tree trunks, costa glossy, leaves ovate to linear-lanceolate, 1-4 mm long, margins recurved, leaf cells papillose and nearly round in upper portion of leaf ..... 41
- 40b. Plants lacking pseudopodium, without above combination of characters ..... 42

- 41a. Plants usually on rotten logs or tree trunks, occasionally on soil, pseudopodium with a globular head of stalked, fusiform gemmae, common ..... *Aulacomnium androgynum*
- 41b. Plants on wet soil, usually in bogs or meadows, pseudopodium with leaf-like gemmae in a cluster at the tip and often singly along its length ..... *Aulacomnium palustre*
- 42a. Plant often matted, low (0.5 to 3 cm high), leaves straight and lanceolate, with distinct leaf tips that break off (run wet finger over top), on logs and tree bases ..... *Dicranum tauricum*
- 42b. Plants lacking these special leaf characters and not as above ..... 43
- 43a. Leaves usually strongly falcate-secund, lanceolate, 5-15 mm, with serrate lamellae on the dorsal side of the costa, median leaf cells elongate; large, glossy, light green plants found on soil, humus, rotten wood, and tree bases ..... *Dicranum scoparium*
- 43b. Leaves not falcate-secund, other features various ..... 44
- 44a. Plant often with erect, smooth capsules, found in mats on rocks, upper and median leaf cells with longitudinal ridges of cuticular thickenings, leaves strongly crisped when dry ..... *Dicranoweisia crispula*
- 44b. Leaves lacking longitudinal ridges ..... 45
- 45a. Plants yellow-green, on very wet soil along streams or in bogs, with reddish stems, papillose leaves with recurved margins, plicate leaf bases, branches of male plants often whorled ..... *Philonotis fontana*
- 45b. Plants not as above, if on wet soil along streams then without coloration and features described above ..... 46
- 46a. At least upper leaves strongly recurved and with hyaline hair points on leaf tips, leaves 3.0-4.5 mm long ..... *Tortula ruralis*
- 46b. Leaves not both strongly recurved and with hair points, sizes various ..47
- 47a. Plants with leaves at most 5 mm long, small plants up to 2.5 cm tall, common and weedy species, usually fertile ..... 48
- 47b. Plants relatively large, leaves 4-9 mm long, stems nearly always greater than 2.5 cm high ..... 49
- 48a. Plants with keeled leaves to 3.5 mm, seta usually red and twisted, occasionally to yellowish in color, median leaf cells irregular to quadrate or short-rectangular but not elongate, capsules inclined to horizontal and usually red to dark purple when dry, operculum not strongly angled relative to capsule ..... *Ceratodon purpureus*
- 48b. Plants with leaves 2-5 mm long, seta usually twisted, wavy and yellow, brown, or reddish brown, median leaf cells tending to be elongate or rectangular, capsules usually strongly inclined, capsules curved in shape and tending to be brownish when dry, operculum at a strongly oblique angle relative to capsule ..... *Funaria hygrometrica*



- 49a. Plants usually on rock, young capsules round and green, older ones brown and ribbed but still rather round, leaves not plicate, costa excurrent ..... *Bartramia pomiformis*
- 49b. Plants usually on soil and often large, stems reddish brown, leaves somewhat plicate, with an orange to brown base, capsule not round ..... *Timmia austriaca*

*Antitrichia californica*



**Characteristics:** The leaves of this species sometimes have supplementary costae. Overall, the plant has strongly julaceous (worm-like) branches, and leaves which are concave, decurrent, serrate, and have strongly revolute margins.

**Notes:** Found on trees or logs or sometimes rock, this species can be found in somewhat moist to very moist habitats.

## *Antitrichia curtipendula*



**Characteristics:** The 1-2 supplementary costae on the side of the main costa are definitive and can usually be seen with a hand lens.

**Notes:** This taxon is uncommon on the Umatilla but easy to identify--only *A. californica* can also have supplementary costae, and this species is distinguished by the lack of julaceous branches and leaf cell walls which are more strongly pitted. It is found on trees or logs, usually in moist drainages.

## *Atrichum selwynii*



**Characteristics:** The undulate lamellae on the ventral surface of the costa, the large (2.5-8.5 mm) undulate leaves, the smooth, upright, cylindrical capsules, and the soil substrate help to distinguish this species.

**Notes:** Usually found on soil, even on roadsides, this is a fairly large, coarse moss with erect, smooth capsules. The undulate leaves differentiate this taxon from the common *Polytrichum* species, which have similar capsules.

## *Aulacomnium androgynum*



**Characteristics:** The round masses of fusiform, stalked gemmae on top of naked pseudopodia distinguish this species.

**Notes:** Found on tree trunks, rotten logs, and stumps, this moss is common on the Umatilla and is usually seen with the asexual pseudopodia. Without them, the long-acuminate leaves with nearly square leaf cells help to distinguish this moss.

## *Aulacomnium palustre*



**Characteristics:** Yellow-green moss with leaf-like gemmae in clusters at the tips and also singly along pseudopodia. The leaves are variable in shape.

**Notes:** This moss is found only on wet soil, usually in bogs or meadows, and is not as common as *A. androgynum* on the Forest. The upper leaf cells are nearly round, and the leaves have recurved margins.



## *Bartramia pomiformis*



**Characteristics:** This is a green to glaucous green moss with long (4-9 mm), linear-lanceolate leaves and very round capsules that are bright green when young. The leaves can be contorted to straight when dry.

**Notes:** Found on soil or soil over rock, this moss is relatively common on rock faces, especially along drainages. The capsules help to distinguish it.

## *Brachythecium collinum*



**Characteristics:** A small moss with imbricate, acuminate leaves that can be somewhat falcate. The stem leaves are only 0.7-1.5 mm long and the branch leaves are less than 1 mm long. The branches are usually julaceous.

**Notes:** This moss occurs on duff or soil. The small size and julaceous branches help distinguish it from other members of the genus.

## *Brachythecium frigidum*



**Characteristics:** Green to yellow-green in color, this moss has plicate leaves, a costa that extends to beyond the middle, and is dioicous.

**Notes:** *B. frigidum* has also been called *B. asperrimum*. It is found on wet soil, logs, or on trees. The plicate leaves and the sexual condition help to distinguish this species from other members of the genus found on the forest.

## *Ceratodon purpureus*



**Characteristics:** The low habit and red to yellow setae help to distinguish this highly variable moss. It has irregular to short-rectangular median leaf cells, and the costa is often slightly excurrent.

**Notes:** This extremely weedy species is especially common on soil after intense fires, but can be found in any habitat and is common on the Umatilla. The median leaf cell shape distinguishes this species from the similar *Funaria hygrometrica*, also found on soil, which has elongate median leaf cells. Also, this taxon has capsules that are more likely to be horizontal and the operculum is not at a distinctly oblique angle.



## *Conocephalum conicum*



**Characteristics:** A large thallose liverwort, *C. conicum* has a distinctive pattern of hexagons on its surface, and in the center of each is a pore.

**Notes:** On moist, sandy soil (usually near streams) or on rock, this liverwort is not common on the forest but is easily recognized by the pattern on the upper surface, which can be seen even at arm's length.

## *Dicranoweisia crispula*



**Characteristics:** A somewhat small moss that has strongly contorted leaves when dry, this species has leaves that are up to 4 mm long with plane margins and thickenings that resemble papillae.

**Notes:** Found most commonly forming cushions on rock, this species is infrequent on forest.



*Dicranum scoparium*



**Characteristics:** The leaves of the moss are usually falcate-secund (as above), and the stems have reddish or whitish tomentum. This species has small male plants borne on the stem rhizoids of female plants.

**Notes:** This moss is found on humus, soil, and logs and is occasional in moist forests. It can be hard to differentiate this species from other members of the genus when the plants are sterile.

*Dicranum tauricum*



**Characteristics:** The fragile leaf tips (upper one third of leaf) which break off easily are distinctive. The color is a light to dark glossy green.

**Notes:** To check for the fragile leaf tips, rub a moistened finger over the top of the specimen and look at your finger. This moss is found on trees or logs, more rarely on humus.

## *Encalypta ciliata*



**Characteristics:** The large, bell-shaped calyptrae are characteristic of this genus. This species has a peristome of one layer and fringed calyptra which covers the unribbed capsules.

**Notes:** Found on rock or soil over rock, this species is more common on noncalcareous substrates than other members of the genus.

## *Eurhynchium praelongum*



**Characteristics:** A fine, delicate appearance, and leaves which are not falcate-secund are important characters. The leaves are usually squarrose, with serrate margins, and the branch and stem leaves are strongly different in shape.

**Notes:** This moss is relatively common on moist soil, logs, or humus. The high amount of branching and the relatively small leaves give this moss a certain “look” which aids identification.



## *Fontinalis antipyretica*



**Characteristics:** A large aquatic moss that may be floating or attached to rocks or roots in water. It is often brownish in color, with stem leaves 3-8 mm long that lack a costa. The branch tips are terete and often more green.

**Notes:** This moss is relatively common, and the very large size of the plant overall and of the leaves themselves, the terete branch tips, and the habitat help to distinguish it.

## *Funaria hygrometrica*



**Characteristics:** A small, weedy, and variable moss that typically has wavy, yellowish or reddish brown setae and small leaves with elongate median leaf cells.

**Notes:** This moss is relatively common, and the small size of the plant overall and leaves with elongate cells help to distinguish it. It is often found in reproductive condition, and the operculum is at a distinctively oblique angle relative to the capsule.

## *Helodium blandowii*



**Characteristics:** A golden to yellow-green, regularly branched moss that is erect. The stems and branches have paraphyllia that are reddish in color and visible above, in a highly exposed specimen that was bright golden when fresh.

**Notes:** Found only in very wet meadows and bogs, often interspersed with *Sphagnum* and vascular plants. The color, erect habit, paraphyllia, and habitat are good identifying characters.

## *Herzogiella seligeri*



**Characteristics:** *H. seligeri* is a very shiny, yellow-green moss with leaves that lack a costa and are usually serrate in the upper portion.

**Notes:** Found on logs or bases of trees, the species has also been called *Isopterygium seligeri*. It is infrequent and is more common at low elevations.



*Homalothecium nevadense*



**Characteristics:** The shiny, golden green color and the upcurled branches are good indicators of the genus. The dry capsule of this species is curved and inclined to horizontal (note: capsules above are from a different moss).

**Notes:** Species within the genus are somewhat difficult to identify when sterile. This species is found on rock and is more common in relatively dry areas.

*Hylocomium splendens*



**Characteristics:** The stair-step growth pattern, with feather-like branches alternating with bare stem patches, distinguishes this moss from all others.

**Notes:** *H. splendens* grows by the stair-step increments every year, so you can “age” this moss. It is relatively common on logs or humus in a variety of forested habitats, sometimes forming very extensive mats.

## *Hypnum revolutum*



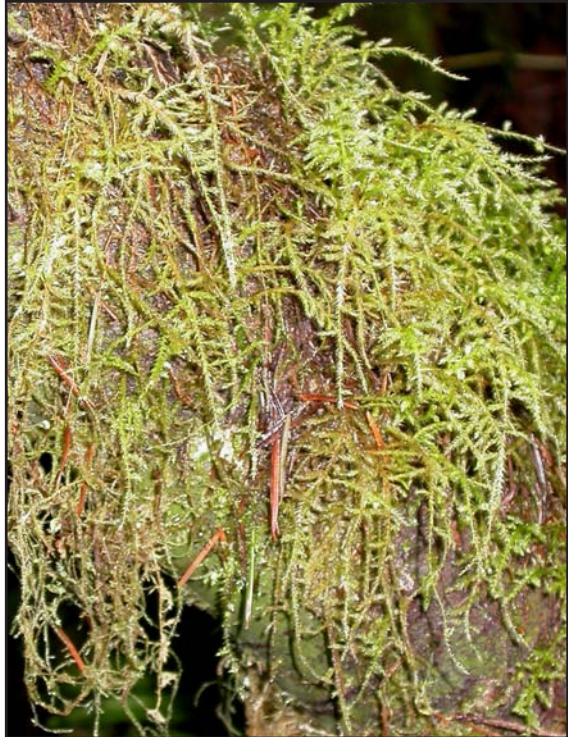
**Characteristics:** A shiny, golden-green moss with falcate-second leaves that lack a costa, this species has revolute leaf margins.

**Notes:** Found on rock or soil over rock, this moss is most common in dry habitats and also on soil after fires. While other species in the genus have a similar overall appearance and are likely to be found on the Umatilla, this species is characterized by the revolute leaf margins.

## *Isoetecium myosuroides*

**Characteristics:** A highly variable moss that can be tufted or have long filiform branches. It is light green to brownish green in color with ovate-lanceolate, serrate leaves.

**Notes:** Often forming tufted mats on the upper side of tree branches, with long filiform branches hanging below, this taxon is restricted to mesic sites.





## *Leucolepis acanthoneuron*



**Characteristics:** This moss has a dendroid growth form, with branches forming an umbrella shape. The branch leaves are toothed, with short median cells and thick walls.

**Notes:** *Climacium dendroides* is also dendroid, but tends not to form the umbrella shape. This moss is found on soil, logs, or humus in very mesic habitats.

## *Marchantia polymorpha*



**Characteristics:** This thallose liverwort has round, green gemmae cups (rather brown above) and umbrella-like, stalked sexual reproductive structures.

**Notes:** Somewhat similar to *Conocephalum conicum*, this liverwort lacks the distinct pattern on the surface. It is especially common on soil after intense fires, but can also be found in boggy areas.

## *Metaneckera menziesii*



**Characteristics:** A large moss, *M. menziesii* has stems with paraphyllia and leaves with a single costa to at least the middle of the leaf. The leaves of the stem and larger branches are complanate and undulate.

**Notes:** Very similar to *N. douglasii*, this moss is found on trees and rocks in very moist habitats. The single costa is a good field identification character.

## *Mnium spinulosum*

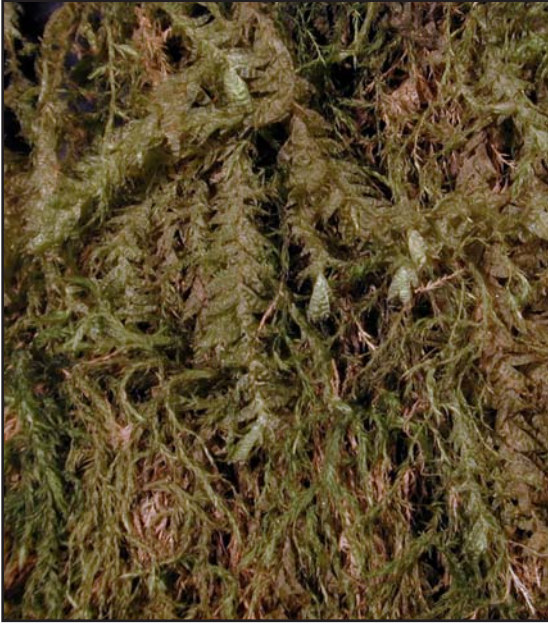


**Characteristics:** Very strongly bordered leaves, margins with large teeth, and small, thick-walled cells at the inner part of the border are identifying characters for the species.

**Notes:** Found on logs and soil in very moist areas. When dry (as above), the leaves are contorted, but when wet, they are large and somewhat translucent.



## *Neckera douglasii*



**Characteristics:** A large moss with complanate and undulate leaves that are lacking a costa (or have a very faint, short and double costa). The leaves are long-acuminate and serrate to around the middle. This moss lacks paraphyllia.

**Notes:** Similar in overall appearance to *Metaneckera menziesii*, this moss is also found on trees and rocks in mesic areas. A very good character to distinguish the two is the presence of the costa. While this species generally lacks a costa, *M. menziesii* has a single costa to at least the middle of the leaf.

## *Orthotrichum lyellii*



**Characteristics:** Generally a large *Orthotrichum*, this species has stems that are usually 3-5 cm long. It is found on bark. The capsules are immersed to emergent, and this species is dioicous. The papillose, lanceolate leaves are usually 4-6 mm long and contorted when dry (as pictured).

**Notes:** Species within this genus can be difficult to distinguish. However, the dioicous condition, leaf shape and size, and substrate differentiate this species from all other members of the genus in our area.

## *Orthotrichum speciosum*



**Characteristics:** The exserted capsule with superficial stomata is an important character of this species. The stems are up to 3.5 mm long, and the lanceolate, papillose leaves are 3-5 mm long. This species is autoicous.

**Notes:** *O. speciosum* is found on trees and on rock. The exserted capsules and the autoicous condition differentiate it from *O. lyellii*.

## *Philonotis fontana*

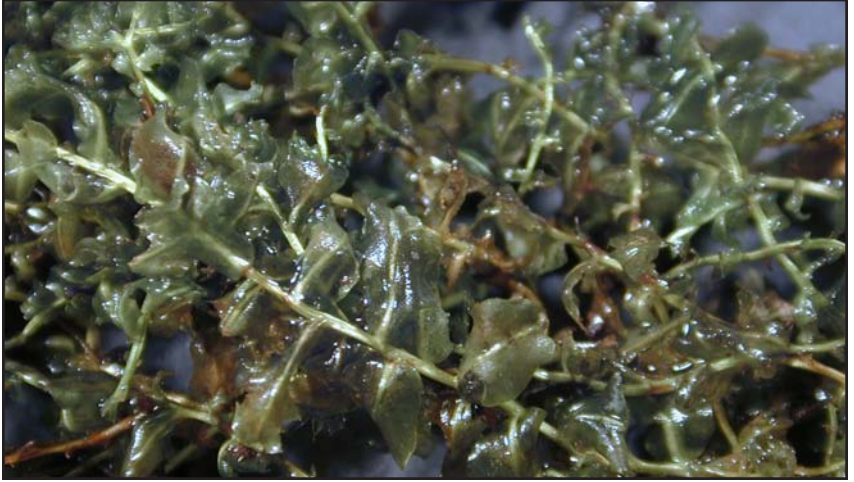


**Characteristics:** This variable moss is usually a light green color (but can be glaucous). It has ovate, costate, serrate leaves that are plicate at least at the base, and it is dioicous, with the branches of male plants often in whorls (as seen at far left). The stems are generally reddish.

**Notes:** This moss forms thick, plush mats on very wet soil and in and along small creeks. It is very common on the Umatilla.



## *Plagiomnium ellipticum*



**Characteristics:** Similar to *P. insigne* in overall appearance, this moss has leaves that are not or only slightly decurrent, and leaf margins that have blunt teeth or are nearly entire.

**Notes:** This moss is found on moist to wet soil, and like *P. insigne*, has strongly contorted leaves when dry, erect fertile stems, and horizontal sterile stems.

## *Plagiomnium insigne*



**Characteristics:** This moss is dioicous and has ovate to elliptic leaves that are 5-7 mm long and strongly decurrent. The leaves are singly, sharply toothed to the base, and the border is unistratose.

**Notes:** Found on moist to very moist soil, this moss has large leaves that are strongly contorted when dry (specimen above is wet). The fertile stems are shorter and erect, while the sterile stems are generally longer and horizontal.



## *Polytrichum juniperinum*



**Characteristics:** A large moss (to 11 cm high), this species has leaves with lamellae on the ventral surface. *P. juniperinum* has an excurrent costa visible as a red, toothed awn and entire leaf margins.

**Notes:** This species is found on soil, usually in disturbed sites. This moss can occupy relatively dry sites, and older specimens become dark or brownish. The leaves are more widely spread when wet than when dry.

## *Porella cordaeana*



**Characteristics:** This leafy liverwort is relatively large and has complanate, rounded upper leaves and subulate lower leaves. The lower lobe of the upper leaf is ruffled.

**Notes:** This liverwort grows in very wet areas, usually on rock, and is not very common on the Umatilla. There are other members of the genus which may occur on the Forest, and specimens should be carefully identified.

### *Ptilidium pulcherrimum*



**Characteristics:** This small leafy liverwort forms mats or small tufts that are reddish or brownish in color when dry and more green when wet (wet specimen is pictured on the left). The leaves are finely dissected and are shaped somewhat like an eyelash. The long, dissected portions of the leaves are easy to see under a dissecting scope and are not soon forgotten.

**Notes:** This species is found infrequently on wood in very humid forests, usually near drainages. If found, it is worth taking an extra look for other taxa associated with humid microclimates.

### *Racomitrium lanuginosum*



**Characteristics:** The gray-green color, sinuose leaf cell walls, smooth leaf cells, presence of a costa, and strongly papillose hyaline awns are identifying characteristics of this species.

**Notes:** Found on relatively moist rock, usually at middle to upper elevations, this moss is infrequent on the Umatilla.

## *Rhizomnium nudum*



### *Sensitive*

**Characteristics:** Tending to form thick tufts or carpets, *Rhizomnium nudum* is generally 1-5 cm in height. This unbranched moss has relatively large, broadly ovate to round leaves 3-7 x 4-9 mm. The leaves are bordered by 2-4 rows of long, narrow cells, and they are only slightly contorted when dry. The costa is usually reddish, and nearly always ends before the apex of the leaf. The median leaf cells are visible with a hand lens, and with a microscope one can see unusually thickened vertical walls that are strongly thickened both top and bottom and thin in the middle, resembling a dumbbell shape. The capsules of this moss are yellow-brown and have a conic-apiculate operculum.

Descriptions of the presence or absence of rhizoids on the stem (above the basal portion) vary, and the recent key by Norris and Shevock provides further information. *R. nudum* lacks micronemata, which arise from enlarged cells without chloroplasts visible on the surface of the stems. Plants lacking micronemata generally have rhizoids confined to clusters on some of the more basal portions of the stem. While this feature may be useful in the field, microscopic examination of whole mounts of stems should be undertaken to determine the presence of micronemata.

**Notes:** *Rhizomnium nudum* is usually found on moist soil in forested areas and along streams. It is also found at higher elevations and can be above timberline near late-persisting snow beds.



## *Rhizomnium nudum*

**Look-alikes:** *R. nudum* is most likely to be confused with other members of the genus or with *Mnium blyttii*. The nearly orbicular, nondecurrent leaves distinguish *R. nudum* from *M. blyttii*. Most other members of the genus, including *R. magnifolium*, have micronemata and the micronemata initials are visible as enlarged, chloroplast-free cells on the surface of the stem.

*Rhizomnium punctatum* and *R. glabrescens* are similar but both have thicker borders at the apex of the leaf that are confluent with the costa. The leaves of *R. nudum* have a thin (1 cell) or nonexistent border at the apex and a costa that tends to disappear before the apex.

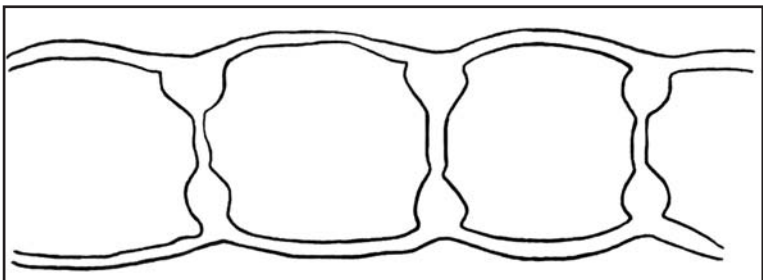


Diagram of cross section of median leaf cells, showing unevenly thickened cells walls in dumbbell shape.

## *Rhytidiadelphus triquetrus*



**Characteristics:** The reddish stem lacking paraphyllia, large branch tips that are tightly curled, large size, irregular branching, and the double costa are characteristic of this moss.

**Notes:** Very common on humus, soil, and logs, this distinctive moss is found in a range of forest types.

## *Rhytidiopsis robusta*



**Characteristics:** The large size, irregular branching, and the double costa are characteristic of this moss. The stem has abundant, branched paraphyllia.

**Notes:** This moss is found in a range of moist forest types. It resembles *Rhytidiadelphus triquetrus*, but has stems with abundant paraphyllia.

*Roellia roellii*



**Characteristics:** This moss resembles members of *Plagiomnium* and *Mnium*, but it has extremely large leaf cells with thin cell walls, wrinkled leaves, and a unistratose border of elongate cells.

**Notes:** Common on duff, the leaf cells of this moss can be seen with a good hand lens. Once seen, the cells are distinctive.

*Sanionia uncinata*

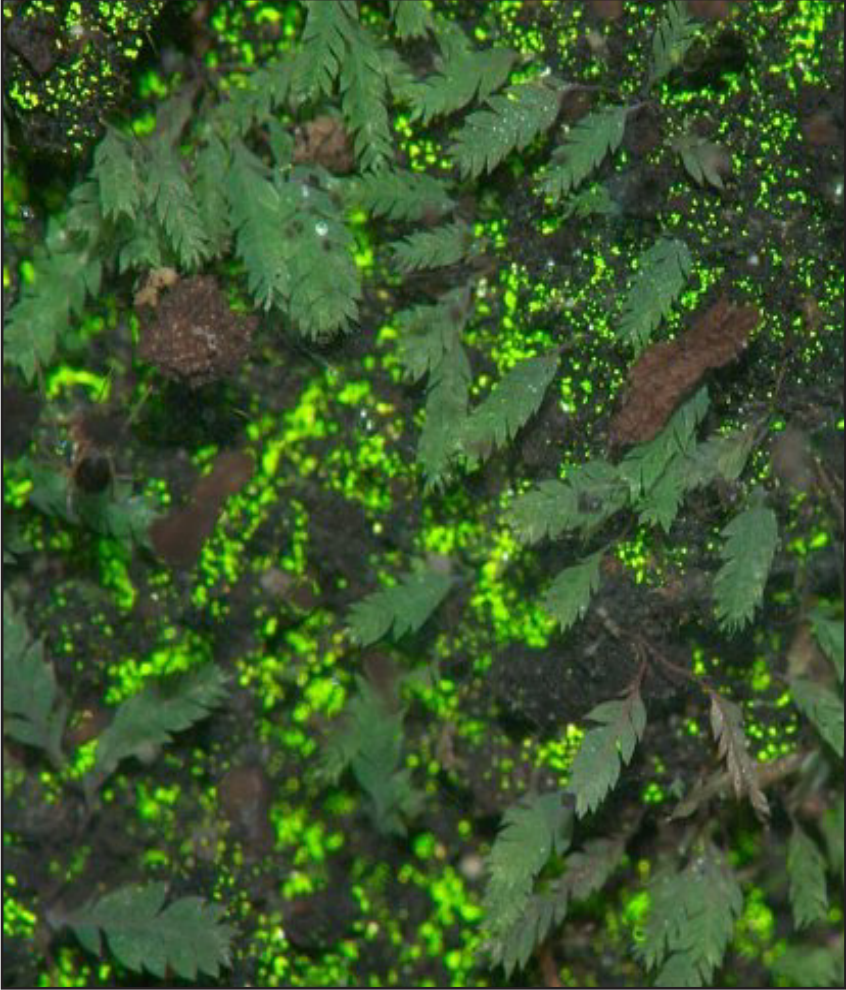


**Characteristics:** The plicate, strongly falcate-secund, costate leaves are characteristic. The leaf apex is filiform, and the branching is irregular.

**Notes:** Most often found on soil or soil over rock, this moss can also be found on trees and logs, and it often forms extensive mats in the proper conditions. Because the leaves are plicate, the costa can be difficult to see at times.



## *Schistostega pennata*



*Image courtesy of Matt Goff*

### *Sensitive*

**Characteristics:** A very distinctive moss with strictly distichous (two-ranked) leaves and simple, unbranched stems. The overall moss is tiny, with stems less than 10 mm long (usually 4-7 mm) and leaves approximately 1 mm long and lacking a costa. The bases of the leaves merge together along the stem. Aside from its distinctive leafy morphology, the protonema of the moss is luminescent and persistent, so that it is possible to see the glowing filaments with the leafy portion of the plant. Sporophytes are borne at the tip of the stem, with a small rosette of leaves at the base. The capsules are erect and lack a peristome.

## *Schistostega pennata*

**Notes:** Perhaps the most characteristic feature of this species is the unique habitat. The shape of the cells of the protonema refracts light, so that this moss can grow in relatively dark conditions. The most common substrate is moist mineral soil or rock, particularly sandstone. It is found in shaded areas under overturned tree roots, often those that have standing water for long periods of time. Other potential habitat locations include moist rock crevices, caves, cellars of old buildings, along shaded banks of waterways, and in swampy forests. Essentially, dark and humid environments are the main requirements. This taxon is considered a pioneer that disappears when the light levels become high enough for other bryophytes.

**Look-alikes:** This species could potentially be confused with species of *Fissidens*. However, *Fissidens* have characteristic sheathing flaps on their leaves so that when held up to light, a portion of each leaf appears to be two layers thick. The capsules of *Fissidens* also have red peristome teeth, whereas *Schistostega* lacks a peristome. Overall, the most difficult task lies in finding this tiny, inconspicuous moss, rather than in identifying it. It is imperative to search overturned tree roots and other dark, moist areas with mineral soil or rock carefully, especially if the area has a high humidity much of the year due to nearby water or other factors.

## *Scouleria aquatica*



**Characteristics:** An aquatic moss with leaves to 4 mm long, usually with green shoot tips and darker brown or black below. This moss has a leaf border that is one or two cell layers thick. The capsules look like doughnuts lying on their sides.

**Notes:** This moss is found attached to rock in clear, flowing water. It is nearly identical in initial appearance to the sensitive *S. marginata*, and can be found growing intermixed with it. See that taxon for more information.

## *Scouleria marginata*



### *Sensitive*

**Characteristics:** This moss often forms extensive, blackish mats on rocks in the splash zone of streams and waterfalls and can withstand being submerged for periods of time. Plants are 2-6 (10) cm long, branched, and are generally green at the tips of the shoots and more darkly colored or black towards the base. The leaves reach 4 mm in length and may be appressed to widely spreading. The costa is prominent and decurrent along the stem. The margins of the leaves are shallowly toothed to entire and have a thickened, brown or blackish margin of 3-5 layers of cells, except at the base and apex. The seta is short, to 2 mm, and the capsule is doughnut shaped and lacking a peristome.

**Notes:** *S. marginata* is restricted to riparian zones and requires cool water with low amounts of sediment. This taxon has been found in both shaded and sunny locations. Any fast-moving or deep stream would be potential habitat. It is usually found on large rocks or on bedrock.



## *Scouleria marginata*

**Look-alikes:** *Schistidium rivulare* may occur in the same habitat and is also blackish, but is only 1-4 cm long, with leaves with recurved margins and cup-shaped capsules with peristomes. *Fontinalis antipyretica* is also riparian, but commonly reaches 20 cm in length, and has much larger leaves in an obviously 3-ranked arrangement. This taxon can be difficult to distinguish from *Scouleria aquatica*, a common moss occurring in the same habitat and which may co-occur with *S. marginata*. *S. aquatica* has leaf margins that are only one to two cell layers thick, conspicuously toothed leaves, and the capsules have peristomes.

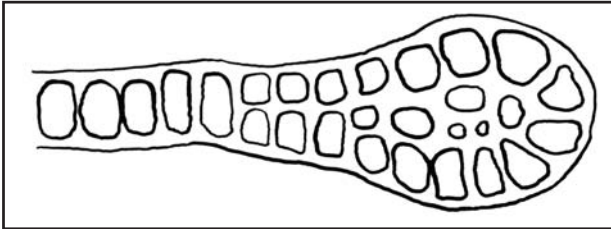


Diagram of median leaf cross section, showing multiple cell layers at margin

## *Sphagnum squarrosum*



**Characteristics:** Usually reddish, yellowish, or whitish, members of this genus have a unique cell arrangement, with green cells interspersed with large, hyaline cells. They typically have a cluster of branches at the apex, and readily absorb water.

**Notes:** These are the peat mosses, and many species look very similar. Consult a specialized text and specimens for accurate identification within this genus.

## *Tetraphis geniculata*



### *Sensitive*

**Characteristics:** This moss is usually an off-green or yellow-brown color and about 7-15 mm high. The stems are usually simple, but sometimes branched, and the leaves are ovate with a prominent midrib. The leaves are not bordered, and have relatively uniform cells throughout. Sterile plants may reproduce vegetatively with propagules in splash cups formed at the tips of shoots. The most distinctive characteristic of this moss is the bent (geniculate) seta, which is usually roughened above the bend. This is especially easy to see at the left side of the image above. The peristome has four large, erect teeth, which is distinctive for the genus.

**Notes:** This taxon grows on well-rotted coniferous stumps and logs in shady, humid areas. The decaying wood is usually dark brown and friable, and maintains moisture for long periods of time. In the field, if kicking the stump or log causes it to collapse, the substrate is appropriate for *Tetraphis*. *Tetraphis geniculata* is very frequently found growing with the more common *Tetraphis pellucida*. Other associates include *Lepidozia reptans*, *Buxbaumia piperi*, and *Aulacomnium palustre*. This moss may also be found on peaty soil or banks in moist forests.

## *Tetraphis geniculata*

**Look-alikes:** This moss is most likely to be confused with *Tetraphis pellucida*. With reproductive material, the distinguishing characteristic is that *T. geniculata* has abruptly bent setae, while *T. pellucida* has straight to slightly flexuose setae. When plants are sterile, the two species may be difficult or impossible to distinguish. Luckily, in this species, sporophytes tend to persist through much of the year.

Asexually reproductive material with gemmae could also be confused with *Aulacomnium androgynum*. *Tetraphis* has a cluster of gemmae subtended by a cup of modified leaves, whereas the gemmae in *Aulacomnium* lack subtending leaves.

## *Timmia austriaca*



**Characteristics:** A relatively large, upright moss, this species has reddish brown stems, strongly sheathing leaves (with the sheath orange in color) with toothed apices, and leaf margins serrate to the middle.

**Notes:** When this moss is wet, the leaves are widely spreading, but dry specimens have somewhat contorted leaves (a dry specimen is pictured). Found on soil in cool and moist forests, this moss is infrequent on the Umatilla.



## *Tortula ruralis*



**Characteristics:** This moss has leaves that are contorted when dry (as above) but are strongly spreading when wet. The leaf tips are obtuse to rounded and have a long, toothed hyaline awn. The leaves are densely papillose.

**Notes:** Common on soil or rock, this moss often has a reddish or brownish cast. It is dioicous, but can resemble the synoicous *T. princeps*.

## *Tripterocladium leuclidulum*



**Characteristics:** A very delicate moss with leaves to 1 mm long, this species has distinctively slender branches. The leaves are ecostate or have a short and double costa, and the leaf cells have thick walls.

**Notes:** This moss is found occasionally on rocks or trunks of trees in very moist forests, especially near drainages.

# Checklist of the Bryophytes of the Umatilla National Forest

Note: Uncertainty in identification is indicated with “*cf.*” before taxon.

## Mosses (Musci)

*Amphidium californicum* (Hampe ex C. Müll.) Broth.  
*Anacolia menziesii* (Turn.) Par.  
*Andraea rupestris* Hedw.  
*Antitrichia curtispindula* (Hedw.) Brid.  
*Antitrichia californica* Sull. in Lesq.  
*Atrichum selwynii* Aust.  
*cf. Atrichum tenellum* (Röhl) Bruch & Schimp. in B.S.G.  
*Aulacomnium androgynum* (Hedw.) Schwaegr.  
*Aulacomnium palustre* (Hedw.) Schwaegr.  
*Bartramia ithyphylla* Brid.  
*Bartramia pomiformis* Hedw.  
*cf. Brachythecium albicans* (Hedw.) Schimp. in B.S.G.  
*Brachythecium collinum* (Schleich. ex C. Müll.) Schimp. in B.S.G.  
*Brachythecium frigidum* (C. Müll.) Besch. (= *B. aperrimum* (Mitt.) Sull )  
*Brachythecium holzingeri* (Grout) Grout  
*Brachythecium hyalotapetum* B. Hig. & N. Hig.  
*Brachythecium leibergii* Grout  
*Brachythecium nelsonii* Grout  
*Brachythecium plumosum* (Hedw.) Schimp. in B.S.G.  
*Brachythecium starkei* Grout  
*cf. Bryoerythrophyllum recurvirostre* (Hedw.) Chen  
*cf. Bryum caespiticium* Hedw.  
*Bryum pseudotriquetrum* (Hedw.) Gaertn. et. al.  
*Bryum turbinatum* (Hedw.) Turn.  
*Bryum weigeli* Spreng. in Biehler  
*Buxbaumia piperi* Best  
*Buxbaumia viridis* (DC.) Moug. & Nestl.  
*Calliargon giganteum* (Schimp.) Kindb.  
*Calliargon stramineum* (Brid.) Kindb.  
*Campylium stellatum* (Hedw.) C. Jens.  
*Ceratodon purpureus* (Hedw.) Brid.  
*Claopodium bolanderi* Best  
*Claopodium crispifolium* (Hook.) Ren. & Card.  
*Cratoneuron filicinum* (Hedw.) Spruce  
*Dichodontium pellucidum* (Hedw.) Schimp.  
*Dicranella crispa* (Hedw.) Schimp.  
*Dicranella palustris* (Dicks.) Crundw. ex Warb.  
*Dicranella schreberiana* (Hedw.) Hilf. ex Crum & Anderson  
*Dicranella subulata* (Hedw.) Schimp.  
*Dicranoweisia cirrata* (Hedw.) Lindb. ex Milde  
*Dicranoweisia crispula* Lindb. ex Milde

*Dicranum fuscescens* Turn.  
*Dicranum pallidisetum* (Bail. in Holz.) Irel.  
*Dicranum scoparium* Hedw.  
*Dicranum tauricum* Sapeh.  
*Didymodon vinealis* (Brid.) Zand.  
*Drepanocladus aduncus* (Hedw.) Warnst.  
*Encalypta ciliata* Hedw.  
*Eurhynchium oreganum* (Sull.) Jaeg.  
*Eurhynchium praelongum* (Hedw.) Schimp. in B.S.G.  
*Eurhynchium pulchellum* (Hedw.) Jenn.  
*Fontinalis antipyretica* Hedw.  
 cf. *Fontinalis neomexicana* Sull. & Lesq.  
*Funaria hygrometrica* Hedw.  
*Grimmia alpestris* (Web. & Mohr) Schleich. ex Nees in Nees et al. (= *Grimmia tenerrima* Ren. & Card.)  
 cf. *Grimmia donniana* Sm.  
 cf. *Grimmia ovalis* (Hedw.) Lindb.  
*Grimmia pulvinata* (Hedw.) Sm.  
*Helodium blandowii* (Web. & Mohr) Warnst.  
*Herzogiella seligeri* (Brid.) Iwats.  
*Heterocladium procurrens* (Mitt.) Jaeg.  
*Homalothecium aeneum* (Mitt.) Lawt.  
*Homalothecium fulgescens* (Mitt. ex C. Müll.) Lawt.  
*Homalothecium nevadense* (Lesq.) Ren. & Card.  
*Hygroamblystegium* sp.  
*Hygrohypnum ochraceum* (Turn. ex Wils.) Loeske  
*Hylocomium splendens* (Hedw.) Schimp. in B.S.G.  
*Hypnum circinale* Hook.  
*Hypnum revolutum* (Mitt.) Lindb.  
*Hypnum subimponens* Lesq.  
*Isopterygiopsis pulchella* (Hedw.) Iwats.  
*Isothecium stoloniferum* Brid.  
*Leptobryum pyriforme* (Hedw.) Wils.  
*Leucolepis acanthoneuron* (Schwaegr.) Lindb.  
*Meiothecium* sp.  
*Metaneckera menziesii* (Hook. in Drumm.) Steere  
*Mnium spinulosum* Bruch & Schimp. in B.S.G.  
*Mnium thompsonii* Schimp.  
*Neckera douglasii* Hook.  
*Oncophorus wahlenbergii* Brid.  
*Orthotrichum laevigatum* Zett.  
*Orthotrichum lyellii* Hook. & Tayl.  
*Orthotrichum obtusifolium* Brid.  
*Orthotrichum speciosum* Nees in Sturm  
*Orthotrichum striatum* Hedw.  
*Oxystegus tenuirostris* (Hook. & Tayl.) A. J. E. Sm. (= *Trichostomum cylindricum* (Brid.) C. Müll)  
*Philonotis capillaris* Lindb. in Hartm  
*Philonotis fontana* (Hedw.) Brid.  
*Philonotis fontana* (Hedw.) Brid. var. *pumila* (Turn.) Brid.



*Plagiomnium ellipticum* (Brid.) T. Kop. (= *P. rugicum* (Laur.) T. Kop.)  
*Plagiomnium insigne* (Mitt.) T. Kop.  
*Plagiomnium venustum* (Mitt.) T. Kop.  
*Plagiothecium laetum* Schimp. in B.S.G  
*Pogonatum urnigerum* (Hedw.) P. Beauv.  
*Porotrichum bigelovii* (Sull.) Kindb.  
*Pohlia cruda* (Hedw.) Lindb.  
*Pohlia nutans* (Hedw.) Lindb.  
*Pohlia proligera* (Kindb. ex Breidl.) Lindb. ex Arnell  
*Polytrichastrum alpinum* (Hedw.) G. L. Sm.  
*Polytrichum commune* Hedw.  
*Polytrichum juniperinum* Hedw.  
*Politrichum piliferum* Hedw.  
*Pseudoleskea incurvata* (Hedw.) Loeske  
*Pseudoleskea patens* (Lindb.) Kindb.  
*Pseudoleskea radicata* (Mitt.) Mac. & Kindb.  
*Pseudoleskea stenophylla* Hedw.  
*Pterigynandrum filiforme* Hedw.  
*Ptychomitrium gardneri* Lesq.  
*Racomitrium canescens* forma *ericoides* (Web. ex Brid.) Mönk.  
*Racomitrium ericoides* (Web. ex Brid.) Brid.  
*Racomitrium heterostichum* (Hedw.) Brid.  
*Racomitrium lanuginosum* (Hedw.) Brid.  
*Racomitrium sudetichum* (Funck) Bruch & Schimp. in B.S.G.  
*Rhizomnium magnifolium* (Horik.) T. Kop.  
*Rhytidiadelphus triquetrus* (Hedw.) Warnst.  
*Rhytidiopsis robusta* (Hook.) Broth.  
*Roellia roellii* (Broth. in Röhl) Andrews ex Crum  
*Sanionia uncinata* (Hedw.) Loeske  
*Schistidium apocarpum* (Hedw.) Bruch & Schimp. in B.S.G.  
*cf. Schistidium papillosum* Culm.  
*cf. Schistidium pulvinatum* (Hedw.) Brid.  
*cf. Schistidium rivulare* (Brid.) Podp.  
*Scleropodium obtusifolium* (Jaeg.) Kindb. in Mac. & Kindb.  
*Scouleria aquatic* Hook. in Drumm.  
*Sphagnum capillifolium* (Ehrh.) Hedw.  
*Sphagnum rubellum* Wils.  
*Tetraphis pellucida* (Hedw.) Gaertn. et al.  
*Thuidium recognitum* (Hedw.) Lindb.  
*Timmia austriaca* Hedw.  
*Tortula intermedia* (Brid.) De Not. (= *Tortula ruralis* (Hedw.) Gaertn. et al.)  
*Tortula mucronifolia* Schwaegr.  
*Tortula norvegica* Web.) Wahlenb. ex Lindb.  
*Tortula ruralis* (Hedw.) Gaertn. et al.  
*Tripterocladium leucocladulum* (C. Müll.) Jaeg.  
*Ulota megalospora* Vent. in Röhl

## Liverworts (Hepaticae)

*Asterella gracilis* (F. Weber) Underw.  
*Athalamia hyalina* (Sommerf.) S. Hatt.  
*Aneura pinguis* (L.) Dumort.  
*Barbilophozia* sp.  
*Blepharostoma trichophyllum* (L.) Dumort.  
cf. *Cephalozia bicuspidata* (L.) Dumort.  
*Cephalozia lunulifolia* (Dumort.) Dumort.  
*Chiloscyphus polyanthos* (L.) Corda  
*Conocephalum conicum* (L.) Dumort.  
*Geocalyx graveolens* (Schrad.) Nees  
*Lepidozia reptans* (L.) Dumort.  
cf. *Lophocolea cuspidata* (Nees) Limpr.  
*Lophocolea heterophylla* (Schrad.) Dumort.  
*Lophozia incisa* (Schrad.) Dumort.  
cf. *Lophozia ventricosa* (Dicks.) Dumort.  
*Marchantia polymorpha* L.  
cf. *Pellia endivifolia* (Dicks.) Dumort.  
*Porella cordeana* (Huebener) Moore  
*Porella roellii* Steph.  
*Ptilidium pulcherrimum* (Weber) Vainio  
*Radula complanata* (L.) Dumort.  
*Reboulia hemisphaerica* (Schrad.)  
cf. *Riccardia chamedryfolia* (With.) Grolle  
*Riccardia latifrons* (Lindb.) Lindb.  
*Riccia cavernosa* Hoffm.  
cf. *Riccia sorocarpa* Bisch.  
*Scapania americana* Müll. Frib.  
*Scapania uliginosa* (Sw. ex Lindenb.) Dumort.  
*Scapania umbrosa* (Schrad.) Dumort

## Hornworts (Anthocerotae)

*Anthoceras punctatus* Paton nom. cons. prop. var. *agrestis* (= *A. punctatus* L.)

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