

Group P2 – Shoots julaceous (especially when dry) – shoots smoothly cylindrical with crowded, overlapping and appressed leaves

Group P2

Leaves with a **narrow, single** costa.

Leaf margins with **cilia**, plant stem and branches with **paraphyllia**; E

Thelia

Leaf margins **serrate** and strongly **revolute** to near apex; alar cells **differentiated**; W

Antitrichia californica[†]

Leaf margins **serrulate**; leaves **concave-cucullate**; leaf tips **twisted** and apiculate; E

Bryoandersonia illecebra

Leaf margins **entire** or slightly serrulate apically; paraphyllia **lacking**.

Median leaf cells **long**.

Branching **±pinnate** and in one **plane**; lawns and disturbed areas; WC, NY

Pseudoscleropodium purum

Branching **irregular**; wet soil and rocks; W

Scleropodium[†]

Median leaf cells **intermediate**; stems **red**; main stems **not** julaceous; A/A

Plagiobryum

Median leaf cells **short**; stems growing **singly** at **right angles** to bark; SE

Cryphaea

Leaves with costa ~1/2 leaf length & **forked**; alar cells **quadrate** & **numerous**; AK, CO, NM

Leptopterigynandrum

Leaves with a **short, double** costa or none.

Leaves **serrulate** to **dentate**; cells **prorulose**.

Leaves **acute** to acuminate; alar cells **numerous** & **strongly** differentiated; WC

Pterogonium

Leaves **rounded-obtuse**; alar cells **indistinctly** subquadrate; WS(N)

Myurella[†]

Leaves spinulose-**serrate** to serrulate at the **apex**.

Leaves spinulose-**serrate** & **hyaline** above; shoots **julaceous**; cells **papillose**; WS

Hedwigia

Leaves with a slightly **serrulate tip**; cells **smooth**.

Shoots curved-**ascending** (dry); alar cells **±undifferentiated**; E

Leucodon[†]

Shoots **straight** (dry); alar cells **numerous** & **quadrate**; E

Entodon[†]

Leaves **entire**; plants in very wet places, e.g., shallow water; alar cells **short** and **wide**; WS*

Scorpidium

Group P3 – Leaves spreading at right angles (squamose) or squamose-recurved; leaf tips often channeled

Group P3

Stems **red**; plants **±robust** and loosely **ascending**; costa **double** (long or short) or lacking; WS*

Rhytidadelphus

Stems **green**; plants **±slender** and **creeping**; costa long and **single**, short and **double**, or lacking; WS*

Campyllum

Group P4– Plants with erect branches from a creeping stem

Group P4

Costa **long** and **single**.

Alar cells **oblong** to **linear** and extending up leaf margin as a **border**.

Leaves **contorted** when dry; leaf cells **smooth**; FL

Groutiella

Leaves **involute** when dry, leaf cells often **bulging** and **papillose**; GC

Macromitrium richardii

Alar cells **quadrate** to **oblate**.

Branching pinnate to **bipinnate** (frondose); costa **toothed** at back; CA

Bestia longipes

Branching **irregular**; costa **not** toothed; alar cells **extending** up leaf margin; E

Forsstroemia producta

Alar cells **±undifferentiated**.

Leaves **contorted** when dry; basal cells uniformly **elongate**; CP, SA

Schlotheimia

Leaves **channeled** at the costa; margins erect or **incurved** at the apex; E

Drummondia prorepens

Leaves often **keeled**, never channeled; margins plane or **reflexed**; SA

Macrocoma sullivanii

Costa **double** with 1 long and 1 short branch; leaves **concave** or oblong-ovate; ON

Neomacounia nitida

Costa **variable** (single, short and double or lacking within the same plant); on trunks of trees.

Secondary stems **sub-pinnately** branched; brood bodies **lacking**; E

Forsstroemia trichomitria

Secondary stems **unbranched**; septate **brood bodies** often present; GC

Jaegerina scariosa

**Group P5– Plants with leaves distinctly sickle-shaped and
turned to one side (falcate-secund)**

	Group P5
Costa long, single and narrow.	
Paraphyllia abundant and filamentous ; stem leaves deeply plicate, not complanate; WS	<i>Palustriella</i>
Paraphyllia lacking .	
Leaf cells prorulose ; leaves plicate and rugose ; WS*	<i>Rhytidium rugosum</i>
Leaf cells smooth .	
Stems with a hyalodermis (thin-walled, hyaline cells on stem surface).	
Leaves plicate and denticulate in upper portion; WS*	<i>Sanionia</i>
Leaves striolate (finely ridged) to plane , and entire to slightly denticulate.	
Alar cells inflated ; plants occurring in streams on rocks or wet places; WS	<i>Hygrohypnum</i> †
Alar cells little differentiated; plants in rich fens ; N	<i>Limprichtia</i>
Stems lacking a hyalodermis (thick-walled cells on stem surface).	
Plants of upland habitats, leaves plicate ; WS	<i>Brachythecium</i> †
Plants of wet habitats, leaves not plicate.	
Leaves keeled, 3-ranked ; WS*	<i>Dichelyma</i>
Leaves neither keeled nor 3-ranked.	
Costa excurrent ; alar cells abruptly inflated or undifferentiated; WS*	<i>Drepanocladus</i> †
Costa subpercurrent ; plants in fens and seeps .	
Leaf margins finely denticulate ; WS*	<i>Warnstorfia</i>
Leaf margins entire .	
Central strand (small cells) in stem; WS*	<i>Drepanocladus</i> †
Central strand lacking ; N	<i>Hamatocaulis</i>
Costa shorter than above; alar cells few and thick-walled ; N	<i>Loeskypnum badium</i> †
Costa short and double , or none.	
Arms of double costa not joined at base; AK	<i>Gollania turgens</i>
Arms of double costa meeting at the base, or none .	
Shoots in flat , evenly pinnate, feather-like, fronds ; plants large ; WS*	<i>Ptilium crista-castrensis</i>
Shoots loosely complanate ; plants very shiny ; leaves very serrulate above; E, NW	<i>Brotherella recurvans</i>
Shoots julaceous ; found in wet places (often submerged); WS*	<i>Scorpidium scorpioides</i>
Shoots lacking the above unique characters.	
Leaf cells prorulose ; leaves crowded & spreading ; alar cells subquadrate ; E, AK, BC	<i>Ctenidium</i>
Leaf cells smooth .	
Alar cells in several rows and thick -walled; leaves serrate above; SE	<i>Heterophyllum affine</i>
Alar cells in 1-2 rows with 2-3 cells inflated; leaves ±serrulate ; E	<i>Pylaisiadelphina tenuirostris</i>
Alar cells in triangular patches; leaves ±entire .	
Plants on wet rocks in mountain streams; branching ±irregular ; WS	<i>Hygrohypnum</i> †
Plants of mesic to wet habitats; branching regularly pinnate ; WS	<i>Hypnum</i>

Group P6 – Plants with paraphyllia or tomentum on stem.

	Group P6 <i>Tomentypnum</i>
Stems with tomentum , calciphile in fens, swamps; WS*	
Stems with paraphyllia .	
Leaves with a short, double costa or none; plants irregularly pinnate.	
Leaves rugose and falcate-secund ; NW, WA, OR	<i>Rhytidiopsis robusta</i>
Leaves smooth , straight and imbricate when dry; costa variable ; WC	<i>Alsia californica</i>
Leaves with a long, double costa; stems red .	
Plants 2-3-pinnate with stepwise flat fronds; upper leaf cells prorulose ; WS*	<i>Hylocomium splendens</i>
Plants irregularly to 1-2-pinnate ; cells smooth or prorulose.	
Leaves spinulose -serrate all around; NE, N	<i>Hylocomiastrum umbratum</i>
Leaves serrate in upper half; stem leaves rugose at acumen base; E	<i>Loeskeobryum brevirostre</i>
Leaves with a long, narrow costa.	
Plants dendroid or plumose ; upper leaf cells short (2-5:1).	
Plants curled dry, leaf margins serrate at tip ; on trees primarily; WC, ID	<i>Dendroalsia abietina</i>
Plants little altered dry; leaf margins strongly serrate in upper half ; on rich soil; E	<i>Climacium</i>
Plants irregular pinnate ; cells linear (> 8:1); margins spinulose ; NE, N	<i>Hylocomiastrum pyrenaicum</i>
Plants complanate ; stem leaves undulate ; W	<i>Metaneckera menziesii</i>
Plants lacking the above unique characters.	
Alar cells inflated in well-marked groups.	
Stem leaves deeply plicate ; paraphyllia filamentous and abundant; soil and rocks; WS	<i>Palustriella</i>
Stem leaves plane ; paraphyllia foliose and few to many; wet areas; WS*	<i>Cratoneuron</i>
Alar cells mostly not differentiated, if so, not inflated.	

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Cells of paraphyllia distinctly papillose over the lumen; margins of paraphyllia often denticulate/serrulate .	
Plants small ; stem leaves <0.6mm ; leaf cells minutely pleuripapillose .	
Leaf cells pleuripapillose on both sides of leaf; E	<i>Cyrto-hypnum</i>
Leaf cells pleuripapillose on backside of leaf only; E, AZ	<i>Rauiella</i>
Plants larger ; stem leaves 1-1.9mm ; branch leaf cells mostly unipapillose .	
Plants 1-pinnate , suberect and wiry ; WS	<i>Abietinella abietina</i>
Plants 2-3-pinnate , mostly spreading and softer ; E, NW	<i>Thuidium</i>
Cells of paraphyllia smooth or indistinctly ornamented; margins of paraphyllia often denticulate/serrulate or ciliate .	
Leaf cells with either forked , or elongate & curved papillae; leaves ovate ; E	<i>Thelia</i>
Leaf cells either prorulose or with short & simple papillae; leaves ±lanceolate .	
Plants 2-3-pinnate & large ; stem leaves 1-1.9mm ; E, NW	<i>Thuidium</i>
Plants regularly 1-pinnate ; stem and branch leaves somewhat differentiated ; E, AZ, NM	<i>Haplocladium</i>
Plants irregularly branched; stem and branch leaves uniform .	
Leaf cells elongate, oblong-rhombic to oblong-linear.	
Paraphyllia linear- lanceolate and numerous.	
Laminal cells papillose or prorulose ; capsules inclined & asymmetric ; W	<i>Pseudoleskea</i> [†]
Laminal cells smooth or distally prorulose ; capsules erect & symmetric ; N*	<i>Lescurea</i>
Paraphyllia filiform and abundant; leaf bases ciliate ; WS*	<i>Helodium</i>
Leaf cells short (isodiametric or nearly so, hexagonal to short-rhombic); W	<i>Pseudoleskea</i> [†]
Leaf cells smooth or indistinctly ornamented.	
Leaf bases ciliate ; WS*	<i>Helodium</i>
Leaf bases lacking cilia; W	<i>Pseudoleskea</i> [†]

Group P7 – Plants with red stems
Group P7Costa **long** and **double**.Stems with **paraphyllia**.Plants **dendroid** (tree-like) on soil in wet, shady places; E*Climacium*Plants **1-3-pinnate** with **arched**, ascending stems.Plants with **stepwise** flat fronds; upper leaf cells **prorulose**; WS(N)*Hylocomium splendens*Plants **lacking** stepwise, flat fronds; leaf cells **smooth**; WS(N)*Hylocomiastrum umbratum*Plants **irregularly** branched; stem leaves **rugose** at acumen base; E*Loeskeobryum brevirostre*Stems **without** paraphyllia and irregularly branched; WS**Rhytidiadelphus*Costa **long** and **single**.Plants **frondose**; branches **circinate** when dry; **paraphyllia** abundant; cells **prorulose**; WC, ID*Dendroalsia*Plants **not** frondose; cells **smooth**.Stems with abundant, filiform & branched **paraphyllia**; WS(N)*Hylocomiastrum pyrenaicum*Stems **lacking** paraphyllia.Leaf margins \pm **revolute** throughout; alar cells **oval** to transversely **elongate**; W, NL*Antitrichia*Leaf margins **plane**; alar cells \pm **undifferentiated**; A/A*Plagiobryum*Costa **short** and **double**, or none.Leaves distinctly **falcate-secund**; WS*Hypnum*[†]Leaves squarrose to **squarrose-recurved**; WS**Rhytidiadelphus*Leaves **straight**.Leaves with a **hyaline** tip; shoots **whitish** and \pm **julaceous** when dry; cells **papillose**; WS*Hedwigia ciliata*Leaves with a **green** tip; leaf cells **smooth**.Alar cells **inflated**, **hyaline** and **thin-walled** in distinct **auricles**; WS (N)*Calliergonella cuspidata*Alar cells **short-oblong** with **thick orange** walls; WS*Pleurozium schreberi*

Group P8 – Plants with shoots flat on top and appearing “braided”
Group P8Costa **single** and **narrow**; pseudoparaphyllia present.Cells **prorulose** on leaf back; regularly 1-pinnate; leaves serrulate **all around**; E, AK, BC*Ctenidium*Cells **smooth**; closely 1-pinnate in **feather-like** fronds; leaf **tips** serrulate; WS**Ptilium crista-castrensis*Costa **short** and **double**, or none; pseudoparaphyllia usually present.Alar cells in **transverse rows** and inflated; leaves **sharply serrulate** above; E, BC, WA*Brotherella*Alar cells in **triangular areas**, inflated or not; leaves entire to serrulate; WS*Hypnum*[†]

Group P9 – Leaves undulate or rugose (irregular undulations)
Group P9Leaves with a **double** costa of **intermediate** length; leaves **plicate** below, **rugose** above; NW*Rhytidiopsis robusta*Leaves with a **narrow**, **single** costa.Leaves **undulate** and **asymmetric**; shoots **complanate**; **paraphyllia** on stems; W*Metaneckera menziesii*Leaves **rugose**; shoots **round**; paraphyllia **lacking**.Leaf cells **prorulose**; WS**Rhytidium rugosum*Leaf cells **smooth**; leaves stoutly **apiculate**; CP, SA*Schlotheimia rugifolia*[†]Leaves with a **short & double** costa, or none.Plants **julaceous** and growing in wet (submerged) areas; WS*Scorpidium scorpioides*Plants **not** julaceous; leaves **complanate & undulate**; on rocks or trees; WS**Neckera*[†]

Group P10 – Leaves dimorphic (two forms on the same axis)

Smaller leaves (amphigastria) on the **ventral** (lower) side of stem in a **single** row; FL, BC, AK
 Smaller leaves on the **dorsal** (upper) side of the stem in **double** rows; FL

Group P10
Hypopterygium
Racopilum

Group P11 – Leaves with awns, hair-points or hyaline apices

Leaves with a **narrow, single** costa.

Leaf cells **papillose**; leaves **catenulate**; costa **pellucid**; W, AK

Claopodium[†]

Leaf cells **smooth**; leaves **not** catenulate; costa **opaque**.

Cell walls strongly **sinuose/nodulose** throughout; WS

Racomitrium[†]

Cell walls strongly **pitted**, especially at bases & apices of leaves; NW

Pseudoleskea[†]

Cell walls **straight** & smooth.

Leaf apex **flat, filiform** and **serrate**; leaves **abruptly** acuminate; N* (S to NC)

Cirriphyllum

Leaf apex a **long, flexuose** tip, leaves **concave** and **shiny**; **pendulous**; FL

Zelometeorium patulum

Leaves with a **short, double** costa or none; apex **hyaline** or abruptly contracted to long **setaceous** point.

Leaf cells **papillose**; leaf apex **hyaline**.

Leaf cells **unipapillose** on both sides; WC

Pseudobraunia californica

Leaf cells with **1** or **more**, simple to **forked** papillae; WS

Hedwigia ciliata

Leaf cells with **many, low, rounded** papillae and very **thick** walls; AZ, TX

Braunia secunda

Leaf cells **smooth**, leaf apex hyaline or yellow.

Leaf apex **yellow**; alar cells **inflated** and **hyaline**; BC

Wijkia carlottae

Leaf apex **hyaline**; alar cells **undifferentiated**; leaves appressed, NW, OR

Iwatsukiella leucotricha

Group P12 – Plants thread-like (leaves <1mm)

Leaves to **1 mm**; costa **variable**; cells **rounded-elliptic**; pseudoparaphyllia **lanceolate**; N,W

Group P12

Leaves **0.5-0.8 mm**; costa none or **short** and **double**; cells **rhombic**; paraphyllia **few**; WS*

Pseudoleskeella

Leaves **0.15-0.5 mm**; costa none or **short** and **double**; cells **rhombic**; paraphyllia **none**; WS

Homomallium

Platydictya

Group P13 – Costa double and more than 1/3 leaf length

Group P13

Note: see Group 20 also for several of these mosses where costa form is variable within a single plant.

Costa **>2/3** the leaf length with branches of \pm equal length.

Leaf cells **unipapillose** on both surfaces; FL, LA

Callicostella pallida

Leaf cells **smooth**; plants in flat **mats**; secondary stems **prostrate**.

Marginal cells **linear** in a **single** row; costa ends **near** apex; FL, LA

Cyclodictyon varians

Marginal cells **little differentiated**; costa \sim **2/3** of leaf length; LA, MS

Trachyxiophium heteroicum

Costa **1/3-2/3** the leaf length with branches of \pm equal length.

Leaf cells **prorulose**.

Stems **red**.

Plants **regularly 2-3**-pinnate with **stepwise** flat fronds; WS*

Hylocomium splendens

Plants **irregularly** branched; leaves **plicate** with broad flat tip; WS*

Rhytidadelphus triquetrus[†]

Stems **green**; plants **loosely** pinnate; leaves **decurrent**; costa **variable**; WS(N)

Heterocladium dimorphum[†]

Leaf cells **smooth**.

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P13 Continued from above

Leaf cells **smooth**.

Paraphyllia **abundant**.

Leaves **spinulose-serrate** all around & **decurrent**; WS(N)

Hylocomiastrum umbratum

Leaves **serrate** in upper half; leaves **not** decurrent; E

Loeskeobryum brevirostre

Paraphyllia often **few** and **inconspicuous**; leaves **decurrent** and **dimorphic**; W

Heterocladium procurrens[†]

Paraphyllia **lacking**.

Leaves **serrate** above; secondary stems **erect**-ascending; FL

Lepidopilum polytrichoides

Leaves **entire** to somewhat serrulate; costa often **variable**.

Leaves slenderly long **decurrent**; costa branches often **unequal**; WS

Plagiothecium[†]

Leaves **not** distinctly decurrent.

Alar cells **subquadrate** and slightly **porose**; in rich, open **fens**; N

Pseudocalliergon turgescens

Alar cells **quadrate** or **inflated**; on rocks in **mountain streams**; WS

Hygrohypnum[†]

Alar cells **thick walled, porose**; plants **irregularly** branched; AK

Rhytidiadelphus japonicus[†]

*Group P14 – Costa single and narrow; leaves with distinct decurrencies***Group P14**

Leaf cells **pleuripapillose**; decurrencies broad to **auriculate**.

Costa \pm **subpercurrent**; leaf margins **crenulate** from projecting papillae; N*

Anomodon[†]

Costa to **mid-leaf** (forked/shorter); leaf margins **serrulate**; leaves **dimorphic**; W,SE

Heterocladium macounii[†]

Leaf cells distinctly **prorulose**; E

Bryhnia

Leaf cells **smooth** or indistinctly ornamented.

Plants large and **dendroid**; leaf tips **rounded** and sometimes apiculate; NW

Pleuroziopsis ruthenica

Plants **arching** and \pm regularly **pinnate**; leaf apical cells **shorter** than medial cells; W

Eurhynchium[†]

Plants **neither** dendroid **nor** arching-pinnate; apical cells **similar** in size to medial cells.

Pseudoparaphyllia **present**; plants of very **wet** habitats; alar cells distinctly **inflated**; N

Calliergon[†]

Pseudoparaphyllia **lacking**; plants & alar cells otherwise.

Leaves **minutely prorulose** with **twisted** apices; cells **3-4:1**; E

Bryhnia novae-angliae

Leaves **smooth** with plane **or** twisted apices; cells mostly **>4:1**.

Plants on **rocks** in or along cold **streams**; costae **variable** from leaf to leaf; WS

Hygrohypnum[†]

Plants on **soil** in drier habitats; costae **not** variable; WS

Brachythecium[†]

*Group P15 – Costa single and narrow; leaves with a distinct marginal border***Group P15**

Leaves bordered with **cilia**.

Cilia from leaf base **to apex**; paraphyllia **polymorphous**, laciniate, ciliate & few to abundant; E

Thelia

Cilia at leaf **base only**; paraphyllia **filiform** and abundant; WS*

Helodium

Leaves bordered with **linear** cells.

Leaf margins **serrulate** to **serrate**.

Shoots **complanate**; leaves **dimorphic** (ventral amphigastria); FL, BC, AK

Hypopterygium

Shoots **angular**; leaves **conduplicate**; plants **submerged** part of year; SE

Brachelyma subulatum

Shoots **round**; leaves **plane** with **multistratose** borders.

Leaves \pm **lanceolate** and acuminate with **serrate, unistratose** marginal cells; OR

Limbella fryei

Leaves \pm **ovate** and acute with **serrulate** marginal cells; E

Platylomella lescurii

Leaf margins **entire**; on rocks and tree trunks.

Border extends to near leaf **apex**; cells **intermediate** in length; BC, CA

Daltonia splachnoides

Border extends to near **mid-leaf**; cells **short**; **cladocarpous**; FL

Groutiella

Group P16 – Costa single and narrow; leaves with distinct alar cells

Group P16

Alar cells distinctly **enlarged** or **inflated**; **hyaline** or **yellow**.

Paraphyllia **present**.

Stem leaves **plicate**; paraphyllia **filamentous** and **abundant**; WS

Palustriella

Stem leaves **plane**; paraphyllia **foliose** and either abundant or few; WS*

Cratoneuron

Paraphyllia **lacking**.

Leaves broadly **rounded** at tip.

Leaves with an **apiculus**; plants **reddish**; A/A

Sarmenthyllum sarmentosum

Leaves **without** an apiculus; alar cells thin-walled; in fens and swamps; N

Calliergon[†]

Leaves **acuminate** or bluntly **acute**.

Leaves **falcate-second**.

In **fens** or other nutrient rich waters.

Alar cells **numerous** in **large** conspicuous groups; WS*

Drepanocladus

Alar cells **few** in **triangular** areas, rectangular and slightly inflated; N

Loeskypnum

On **rocks** in or along **streams**; alar cells **subquadrate** to **oblong**; WS

Hygrohypnum

Leaves **straight**.

Leaves narrowed to long, **channeled acumen**; WS*

Campylium polygamum

Leaves ovate-lanceolate and **narrowed** to an **acumen**; WS*

Drepanocladus aduncus var. *kneiffii*

Leaves **acuminate**; alar cells often in broad **decurrencies**; WS

Brachythecium[†]

Alar cells **small** and **subquadrate**.

Leaves \pm broadly **oblong-ovate**.

Shoots \pm **julaceous**.

Leaves abruptly **apiculate**; plants **erect**; in **lawns** and gardens; WC, NY

Pseudoscleropodium purum

Leaves **rounded** to acute; plants **prostrate**; on **rocks** in or along **streams**; WS

Hygrohypnum

Shoots \pm **complanate**; costa **stout**; large **patch** of alar cells; SC, GC

Stereophyllum radiculosum

Shoots **neither** julaceous **nor** complanate; **creeping** stems and erect branches; E

Forsstroemia producta[†]

Leaves **ovate** to **ovate-lanceolate**.

Leaf margins distinctly **serrate** above.

Branching pinnate to **bipinnate** (frondose); medial cells **<2:1** (\pm isodiametric); CA

Bestia longipes

Branching **irregular** to sub-pinnate; medial cells **>2:1**; WS(WC & SA)

Isoetium

Leaf margins **entire** to serrulate.

Leaf cells distinctly **papillose**; leaf acumen **pale**; WS(E)

Lindbergia brachyptera

Leaf cells distinctly **prorulose**; leaves falcate, plicate & **rugose**; WS*

Rhytidium

Leaf cells \pm **smooth**; leaf apices **green**.

Shoots \pm **julaceous** (dry); costa **stout**; exostome teeth \pm **lanceolate**.

Costa **>1/2** leaf length & **not** forked; TX, NM

Lindbergia mexicana

Costa **1/3-1/2** leaf length & **forked**; AK, CO, NM

Leptopterigynandrum

Shoots **not** julaceous.

Costa **subpercurrent** ($>2/3$ the leaf length).

Paraphyllia **common**; stems & costa \pm **orange**; cells \pm **prorulose**; N*

Lescuraea

Paraphyllia **lacking**; stems & costa **green**; cells **smooth**.

Leaves **recurved** below & **serrulate** above; brood bodies **lacking**; N, W *Pseudoleskeella*[†]

Leaves **plane** below & **entire** above; **brood branchlets** common; WS

Leskeella

Costa **1/3 – 2/3** the leaf length.

Alar cells in **numerous** rows; on **bark** primarily; SE, OH

Clasmatodon parvulus

Alar cells in a **few** rows; on **rock** primarily; N, W

Pseudoleskeella[†]

Leaves \pm **lanceolate**; shoots **not** julaceous; plants **prostrate**.

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P16 Continued from above

Leaves **±lanceolate**; shoots **not** julaceous; plants **prostrate**.

Leaves on **±complanate** shoot; costa **stout**; large **patch** of alar cells; SC, GC

Leaves **plicate** and coarsely **serrate**; upper leaf cells **thick**-walled; SA, TX

Leaves narrowed to long, **channeled acumen** and **±squamose-recurved**; WS*

Leaves and cells **lacking** any of the above unique characters.

Alar cells **asymmetrically** grouped (more on one side of costa.); FL

Alar cells **symmetrically** arranged; WS

Stereophyllum leucostegum

Palamocladium leskeoides

Campylium†

Entodontopsis leucostega

Brachythecium†

Group P17 – Costa short and double, or none; leaves with distinct decurrencies

Group P17

Leaf cells 1-4 **papillose**; costa **variable**, usually single/forked; leaves **dimorphic**; W, SE

Leaf cells **smooth**; costa short and double, or about 1/2 leaf length

Leaf margins serrulate to **serrate** all around; alar cells abruptly **inflated**; WS*

Leaf margins **entire** or with serrulate tips.

Plants on **rocks** in or along cold **streams**; costae **variable** from leaf to leaf; WS

Plants on **soil** in drier habitats; costae **not** variable.

Alar cells abruptly **inflated**; AK

Alar cells **poorly** differentiated; WS

Heterocladium macounii†

Herzogiella striatella†

Hygrohypnum†

Herzogiella adscendens†

Plagiothecium

Group P18 – Costa short and double, or none; leaves with a distinct marginal border

Group P18

Leaves bordered with **cilia**; paraphyllia few to abundant (costa usually single); E

Leaves bordered with **linear** cells from base to mid-leaf; margins entire; on rocks or trees; FL

Thelia

Groutiella

Group P19 – Costa short and double, or none; leaves with distinct alar cells

Group P19

Alar cells distinctly **enlarged** or **inflated**; **hyaline** or **yellow**.

Leaves distinctly **falcate-secund**.

Plants **regularly** pinnate, feather like; **flat** oblong, **triangular** fronds; WS*

Ptilium crista-castrensis

Plants **irregularly** pinnate to unbranched.

Plants in **calcareous** wet areas; leaves concave and apiculate; WS*

Scorpidium scorpioides

Plants **on rocks** in mountain **streams** or wet places; leaves ovate and concave; WS

Hygrohypnum

Plants in **other** habitats.

Stems with a **hyalodermis**; alar cells in large, almost decurrent areas; WS

Hypnum

Stems **lacking** a hyalodermis; leaf apices serrate to serrulate.

Alar cells **subquadrate** and in **±triangular** group; apices **serrate**; SE

Heterophyllum

Alar cells **oblong** and in **±triangular** group; apices **serrulate**; E, NW

Brotherella

Alar cells **oblong** and in **rows** 1(-2) cells wide; apices **±entire**; E

Pylaisiadelphina tenuirostris

Alar cells **few** with short-oblong cells above; apices **serrulate**; WS

Hypnum

Leaves **homomallous**; alar cells abruptly and strongly inflated as "**bubble**" cells; E

Sematophyllum

Leaves **neither** falcate-secund **nor** homomallous.

Stem leaves contracted to a long, yellow, **setaceous point**; BC

Wijkia carlottae

Stem leaves **without** a setaceous point, acute, acuminate or apiculate.

Leaves **squarrose-recurved**; alar cells oblong and **±inflated**; WS*

Rhytidiadelphus squarrosus[†]

Leaves **erect** to **spreading**; alar cells hyaline.

Plants **erect**; stems with a **hyalodermis**; alar cells in distinct **auricles**; WS

Calliergonella cuspidata

Plants **prostrate**; alar cells **not** in auricles.

Cells at leaf insertion **enlarged** in 1 or 2 **distinctive rows**.

Alar cells **rounded** to the insertion; on rotten logs; FL

Acroporium smallii

Alar cells **not** rounded to the insertion.

Alar cells **strongly** inflated as "**bubble**" cells; setae ~3 **cm**; E

Sematophyllum

Alar cells **somewhat** inflated; setae ~3 **mm**; epiphytic; FL

Donnellia commutata

Cells at leaf insertion **not** in a distinctive row; leaves **>1mm**.

Leaves **serrulate** throughout and **decurrent**; alar cells **thin**-walled; WS*

Herzogiella

Leaves **entire**, **not** decurrent; alar cells **thick**-walled; WS

Callicladium haldanianum

Alar cells **quadrate** to **short** oblong.

Leaves distinctly **secund**, or **falcate-secund**; leaf cells **smooth**.

Leaves **ovate** and **concave**; plants of wet places and in mountain streams; WS

Hygrohypnum

Leaves **lacking** any of the above unique characters.

Costa to ca. **1/3** the leaf length with the 2 branches **separate** at the base; AK

Gollania turgens

Costa **shorter** with branches **joining** at the base; pseudoparaphyllia common; WS

Hypnum

Leaves **straight**, or indistinctly falcate-secund.

Leaves **wide-spreading** to squarrose-recurved and with a long, **channeled acumen**; WS*

Campylium[†]

Leaves **flattened** into one plane, i.e., shoots **complanate**.

Leaves serrulate **throughout**; stem **hyalodermis** present; WS*

Herzogiella turfacea

Leaves serrulate in **upper half**; stem hyalodermis **lacking**; E

Isopterygium tenerum

Leaves **entire** except at apex; alar cells **numerous**; WS (not WC)

Entodon

Leaves **±concave** and **imbricate**, i.e., shoots **±julaceous**.

Branches **strongly curved** when dry; **numerous** alar cells extending up **leaf margins**; E, AZ

Leucodon

Branches **±straight** when dry; alar cells otherwise.

Stems **red**; alar cell walls **thick** and **orange**; WS

Pleurozium schreberi

Stems **green**; alar cell walls **thin** and **colorless**; SE

Taxiphyllum cuspidifolium[†]

Leaves **lacking** any of the above unique characters.

Continued below

P19 Continued from above

Leaves **lacking** any of the above unique characters.

Branches **strongly curved** when dry; straight when moist.

Leaf cells **>5:1**; **5-20** quadrate alar cells at the **basal angles**; WS*

Pylaisiella

Leaf cells **~3:1**; **numerous** oblate alar cells extending up **leaf margins**; E, AZ

Leucodon

Branches **loosely curved** when dry.

Stems with numerous **paraphyllia**; WC

Alsia californica

Stems **lacking** paraphyllia.

Capsules **±erect & symmetric**; upper leaf cells **narrowly** rhomboidal.

Leaf margins **reflexed** below; **brood branchlets** common; WS*

Platygyrium

Leaf margins **planar** below; brood branchlets **lacking**; WS*

Pylaisiella

Capsules **±inclined & asymmetric**; upper leaf cells **shortly** oblong-rhomboidal; WS*

Homomallium

Branches **±straight** when dry; stems **without** paraphyllia.

Leaves **<1 mm**.

Leaves **catenulate**; cells **smooth**; N,W

Pseudoleskeella[†]

Leaves strongly **appressed**; cells **minutely** pleuripapillose; AK, CO, NM

Leptopterigynandrum

Leaves **>1 mm**.

Leaf cells **prorulose**; alar cells **transversely** elongate; WC

Pterogonium gracile

Leaf cells **smooth**.

Alar cells extending up the margins for **<1/6** of leaf length.

Leaves **acuminate**.

Stem leaves **serrulate** throughout; WS*

Herzogiella seligeri

Stem leaves **entire** & somewhat decurrent; WC

Tripterocladium

Leaves mostly **obtuse** to **acute**; WS (not WC)

Entodon

Alar cells extending up margin for **>1/6** leaf length.

Plants **tufted** from vertical surfaces; capsules **±immersed**; E *Forsstroemia trichomitria*[†]

Plants in **mats** on horizontal surfaces; capsules **exserted**; WS*

Homomallium

Group P20 – Costa of uncommon or variable form

Group P20

Costa of **uncommon** form.

Costa **long, wide** and with lateral **spurs**; leaves with multistratose **streaks**; TX *Donrichardsia macroneuron*

Costa **single** with several minor basal, **supplementary** costae; stems **red**; W, NL *Antitrichia*

Costa **single** with a **forked** tip (Y-shaped); AK, CO, NM *Leptopterigynandrum austro-alpinum*

Costa **variable** on **same plant** (single or double or variations of these in different leaves).

Costa **usually variable** (double, double with a long branch, Y-shaped, single, forked or short and double).

Found on **rocks** or **wet** places in **mountain** streams; WS *Hygrohypnum*

Found on **trees** near coast; plants with many paraphyllia; WC *Alsia californica*

Costa **mostly double** (1/3-2/3 leaf length), but sometimes single or short and double.

Stems loosely **pinnate**; leaves **dimorphic** and **decurent**; on soil, rock and trees; WS(N) *Heterocladium*

Stems **scarcely** branched; leaves **neither** dimorphic **nor** decurrent; fens; N *Pseudocalliergon turgescens*

Costa **mostly double** with one **long** branch (to 1/3 leaf length) and one **short** branch, but

occasionally **single** or **short** and **double**; ON *Neomacounia nitida*

Costa **mostly single** within the genus or the given species.

Costa rarely to often **forked** (with or without a spine), Y-shaped or with lateral **spurs**.

Plants **large** and \pm robust; stem leaves typically **>2** mm.

Leaves **serrulate** to near base with **short** and **broad** apical cells; WS *Platyhypnidium riparioides*[†]

Leaves **entire**, broad, concave and with apical cells **similar** to medial cells.

Leaves abruptly **apiculate** (**reflexed**); **weedy** habitats; WC, NY *Pseudoscleropodium purum*

Leaves **rounded** to bluntly acute; plants of **fens** and **swamps**; N *Calliergon*

Plants **medium** in size; stem leaves typically **1-2** mm.

Leaf margins strongly **serrate**; alar cells distinct and **quadrate**; E, WC *Isotheceum*

Leaf margins **entire**; costa occasionally Y-shaped; in bogs; WS* *Drepanocladus simplicissimus*[†]

Plants **small** and **slender**; stem leaves **<1** mm; W, SE *Heterocladium macounii*

Costa occasionally to frequently **short** and **double**.

Leaf margins **ciliate**; E *Thelia*[†]

Leaf margins **serrulate**; leaves **decurent**; W, SE *Heterocladium macounii*

Leaf margins \pm **entire**; secondary stems sub-pinnately **branched**; E *Forsstroemia trichomitria*[†]

Costa **mostly short** and **double** within the genus or the given species.

Costa often **double** with **one** or **both** branches to 1/2 leaf length.

Leaves **decurent**; leaf margins mostly entire; WS *Plagiotheceum*

Leaves **not decurent**.

Leaf margins **serrulate** to **dentate**; branches **terete** (round); E *Myurella siberica*[†]

Leaf margins serrulate **above**; branches **complanate**; E, SW *Taxiphyllum*

Costa occasionally to often **single**.

Plants with **erect** branches from creeping stems; septate **brood bodies**; GC *Jaegerina scariosa*

Plants **thread-like**; leaves to 1 mm; N, W *Pseudoleskeella tectorum*[†]

Note: Only the genera in normal type (NOT in brackets) in the Skeleton to Freely Branched Mosses are included in the following Groups.

Reminder: Definitions for cell length to breadth ratios are found in the Introduction, the Overview and at the end of this section. An expanded explanation of the difference between "Distinct" and "Indistinct" surface ornamentation is found in the Introduction.

Group P21 – Cells long (>8:1), distinctly papillose or prorulose

Leaf cells **papillose**; WS*

Group P21
Chryso-hypnum diminutivum

Leaf cells **prorulose**.

Shoots **curved**-ascending (dry); leaves **plicate**, but not decurrent; W

Homalothecium[†]

Shoots **straight** (dry); leaves **smooth & decurrent**; E, AK

Bryhnia[†]

**Group P22 – Cells long, smooth or indistinctly ornamented[#];
costa single (long and narrow)**

Shoots **curved-ascending** when dry; leaves **plicate**; W, NL

Group P22
Homalothecium[†]

Shoots **julaceous**; leaves obtuse or acute; plants in or near streams; W

Scleropodium[†]

Shoots **complanate**.

Leaves **serrulate** throughout with **twisted** tips; in **mesic** habitats; WS*

Stereocleus serrulatus

Leaves **entire** and wide **spreading**.

Leaves **crowded**; alar cells **numerous** and **quadrate**; FL

Stereophyllum leucostegum[†]

Leaves **distant**; alar cells **few** and short-to-long **rectangular**; WS

Leptodictyum riparium[†]

Shoots **triangular**; leaves **keeled**, **3-ranked** and slenderly acuminate; in wet places; WS*

Dichelyma

Shoots **lacking** any of the above unique characteristics.

Plants **large** and **±pinnately** branched; basal cells **porose**.

Shoots **±erect**; leaves deeply **plicate**; W

Trachybryum megaptilum

Shoots **prostrate** to arching; leaves **plane**; W

Eurhynchium[†]

Plants with **irregular** branching; leaves spreading and **±lanceolate**.

Cells at branch leaf apex much **shorter** than median cells; costa often ending in **spine**.

Plants **aquatic** (on rocks in flowing water); branch leaves **1.2 mm** or longer; WS

Platyhypnidium

Plants on moist humic **soil**; branch leaves **<1.2 mm**; WS

Eurhynchium[†]

Cells at apex **similar** to medial cells; costal spine or tooth present or absent.

Costa **distinct**; brood bodies **lacking**; WS

Brachythecium[†]

Costa **indistinct** at mid-leaf; **gemmae** or rhizoids often at back of costa; WS

Conardia compacta

Plants **small**, on **tree trunks**; leaves **serrulate** and **±homomallous**; E

Homalotheciella subcapillata

[#] Cells with low papillae or short projections.

**Group P23 – Cells long, smooth or indistinctly ornamented[#];
costa double (long or short) or none**

		Group P23
Leaves with a long , double costa; E		<i>Loeskeobryum brevirostre</i>
Leaves with a short , double costa or none .		
Plants aquatic , submerged part of year; cells not porose; leaves keeled or flat; WS		<i>Fontinalis</i>
Plants not aquatic .		
Rhizoids papillose ; stem hyalodermis well or moderately developed.		
Alar cells inflated or quadrate ; leaves ±serrate throughout; WS*		<i>Herzogiella</i>
Alar cells ±undifferentiated ; leaves entire ; WS*		<i>Isopterygiopsis</i>
Rhizoids smooth ; stem hyalodermis lacking .		
Leaf apical cells shorter than medial cells; pseudoparaphyllia foliose ; E, SW		<i>Taxiphyllum</i>
Leaf apical cells similar to medial cells in length..		
Alar cells quadrate ; pseudoparaphyllia filamentous ; E		<i>Isopterygium</i>
Alar cells ±undifferentiated ; pseudoparaphyllia lacking .		
Leaves complanate and serrate above; brood bodies often present; WS	<i>Pseudotaxiphyllum</i>	
Leaves neither complanate nor serrate; cells mostly porose throughout; A/A	<i>Orthothecium</i>	

[#] Cells with low papillae or short projections.

Group P24 – Cells intermediate (3-8:1), distinctly papillose or prorulose

		Group P24
Leaf cells papillose .		
Cells pleuripapillose ; papillae in a single row over the cell lumen.		
Costa single and narrow; papillae simple , on both surfaces of leaves.		
Leaves ±ovate , ±plicate and from a chordate , ±auriculate base; FL, LA.	<i>Papillaria nigrescens</i>	
Leaves narrowly lanceolate and not auriculate; festoons on twigs and branches; GC	<i>Barbella pendula</i>	
Costa lacking ; papillae simple or forked , on upper surface only ; E, SW	<i>Taxithelium planum</i>	
Cells unipapillose ; axillary, filiforme, septate brood bodies often present; FL	<i>Henicodium geniculatum</i>	
Leaf cells prorulose .		
Costa long and single .		
Paraphyllia abundant ; on rocks in mountains; N*	<i>Lescuraea</i>	
Paraphyllia lacking ; short, axillary, spindle-shaped brood bodies ; FL to LA.	<i>Pirella</i> [†]	
Costa short and double ; plants small and creeping.		
Plants dull ; axillary brood bodies present; cells thick -walled; WS*	<i>Pterigynandrum filiforme</i>	
Plants shiny ; brood bodies lacking ; cells thin -walled; NC, TN	<i>Leptohyemium sharpii</i>	

**Group P25 – Cells intermediate, smooth or indistinctly ornamented[#];
costa single and narrow**

	Group P25
Leaves ±falcate to falcate-secund .	
Leaves keeled , 3-ranked , slenderly acuminate; plants periodically submerged ; WS*	<i>Dichelyma</i>
Leaves plicate ; plants of upland habitats.	
Stems & costa ±orange ; branch leaf cells ±prorulose distally; paraphyllia common; N*	<i>Lescuraea</i>
Stems & costa green ; branch leaf cells smooth ; paraphyllia lacking ; WS	<i>Brachythecium</i> [†]
Leaves straight .	
Plants on tree trunks .	
Plants of medium size.	
Short , axillary, spindle-shaped brood bodies ; FL to LA.	<i>Pireella</i>
Long , axillary, filiform brood branchlets ; FL.	<i>Pseudocryphaea domingensis</i>
Plants small to very small.	
Leaves with serrulate margins and long- acuminate apices; branches ±julaceous ; WS	<i>Fabronia</i>
Leaves with entire margins and gradually acuminate apices; E	<i>Anacamptodon splachnoides</i>
Plants on rocks or soil in mesic to wet habitats.	
Plants with julaceous shoots; leaves broadly ovate and concave.	
Stems red ; main stems not julaceous; leaf margins ±revolute throughout; W, NL	<i>Antitrichia</i>
Stems green ; leaf margins plane or recurved below.	
Median leaf cells >8:1 ; AK	<i>Myuroclada maximowiczii</i>
Median leaf cells <8:1 ; W	<i>Scleropodium</i>
Plants not julaceous.	
Leaves broadly oblong to ovate, concave and with rounded to cucullate apices.	
Plants reddish ; stem tips cuspidate ; leaf tips often apiculate ; A/A	<i>Sarmenthyphnum sarmentosum</i>
Plants green ; stems ±julaceous ; costa often with spines ; W	<i>Scleropodium</i>
Leaves ovate lanceolate , ±plane and with mostly acuminate apices.	
Apical cells much shorter than median cells; costa ending in a spine ; WS	<i>Eurhynchium</i> [†]
Apical cells similar to medial cells in length.	
Costa percurrent to excurrent.	
Costa very wide (75-140 μ); leaf margins ±entire ; WS	<i>Hygroamblystegium</i> [†]
Costa narrow (<35 μ); leaf margins serrulate to serrate above.	
Stems & costa ±orange ; leaf cells ±prorulose ; paraphyllia common; N*	<i>Lescuraea</i>
Stems & costa green ; leaf cells smooth ; paraphyllia lacking ; WS	<i>Brachythecium</i> [†]
Costa 1/2 to 3/4 leaf length.	
Leaf margins serrulate above to throughout.	
Cells 3-5:1 ; capsules ±cylindric and yellowish ; WS	<i>Amblystegium serpens</i> [†]
Cells >5:1 ; capsules ±oblong-ovoid and reddish ; WS	<i>Brachythecium</i> [†]
Leaf margins ±entire .	
Leaves ±wide-spreading ; capsules ±cylindric and yellowish ; WS	<i>Leptodictyum</i> [†]
Leaves ±erect ; capsules ±oblong-ovoid and reddish ; WS	<i>Brachythecium</i> [†]
Plants ±erect on forest litter , large and pinnately branched; leaves deeply plicate ; W	<i>Trachybryum megaptilum</i>

[#] Cells with low papillae or short projections.

**Group P26 – Cells intermediate (3-8:1), smooth or indistinctly ornamented[#]
costa short and double or none**

Group P26Plants growing in **aquatic** habitats.Plants **trailing** from a single attachment point in flowing water; leaves keeled or flat; WS*Fontinalis*Plants **not** trailing from a single attachment point.Plants **large** and **sparsely** branched; foliose **pseudoparaphyllia**; in fens; N*Pseudocalliergon turgescens*Plants **medium** and **freely** branched; cells lax, **translucent** and **empty** looking; FL*Vesicularia vesicularis*Plants growing in **terrestrial** habitats; plants small to medium in size.Leaves **dimorphic** (stem vs. branch) and **decurrent**; costa **1/3-1/2** leaf length; W*Heterocladium procurrens*[†]Leaves **±homomallous**; alar cells abruptly and strongly **inflated**; on rotten logs; FL*Acroporium smallii*Leaves of stem **straight**, with a long **setaceous** point; on trees; NW, OR*Iwatsukiella leucotricha*Leaves **striate** to **plicate**; leaf cells **porose** throughout; paraphyllia foliose if present; A/A*Orthothecium*Leaves **obtuse**, symmetric and **incurved** at base on one side **only**; NC, SC*Bryocrumia vivecolor*

Group P27 – Cells short (<3:1) and distinctly papillose or prorulose

Group P27Leaf cells **pleuripapillose** (2-5 papillae per cell).Leaves **fragile** above a short ovate base, appressed (dry) and spreading (wet); E*Haplohymenium triste*Leaves **not** fragile.Cells **nodulose** (wavy) throughout the leaf; WS*Racomitrium*Cells **thick**-walled and **porose**; plants coarse and forming large mats; rocks; AZ, TX*Braunia secunda*Cells **neither** nodulose **nor** porose.Leaf margins **papillose-crenulate**; basal, interior cells **pellucid**; E*Anomodon*Leaf margins **entire** to **serrulate** throughout; basal, interior cells **not** pellucid.Stems **papillose**; leaves **not** catenulate; costa **opaque & variable**; W, SE*Heterocladium macounii*Stems **smooth**; leaves **catenulate**; costa **pellucid & uniform**; W, AK*Claopodium*Leaf cells strictly **unipapillose**.Leaves **appressed** (dry), **squarrose** (wet), **±lanceolate** & with a **pale acumen**; WS(E)*Lindbergia brachyptera*[†]Leaves **not** squarrose (wet).Costa **long** and **single**.Leaf margins **serrulate** to **serrate** throughout; costa **pellucid**; leaves **catenulate**; W, AK*Claopodium*Leaf margins **entire** to subserrulate above; costa **opaque** and often **flexuose** above.Stems regularly **1-pinnate** with scarce to abundant **paraphyllia**; E, AZ, NM*Haplocladium*Stems **irregularly** branched.**Paraphyllia** present; alar cells **±quadrate** in small to large groups; W*Pseudoleskea*[†]Paraphyllia scarce to **lacking**; alar cells **±undifferentiated**; E, OR*Leskea*[†]Costa **short** and **double** or none; leaf margins dentate to **spinulose-dentate**; E*Myurella*[†]Leaf cells **prorulose** at back, especially at upper ends of leaves.Leaves strongly **dimorphic** (stem and branch leaves dissimilar); WS(N)*Heterocladium dimorphum*[†]Leaves **not** dimorphic.Branches **julaceous**; leaves **rounded-ovate** and **obtuse**; WS(N)*Myurella julacea*[†]Branches **terete**; leaves ovate-**lanceolate** and **acuminate**.Costa **long & single**; W*Pseudoleskea*[†]Costa **lacking**; E*Schwetschkeopsis fabronia*

Group P28 – Cells short (<3:1) and smooth or indistinctly ornamented[#]

Group P28

Costa long and **single**.

Shoots usually with dense **clusters** of axillary brood **branchlets**; often on bark; WS

Leskeella nervosa

Shoots **julaceous** when **dry**; leaves **wide** spreading wet; commonly on bark.

Stems **freely** branched; leaves **±acute**; capsules **exserted**; NM, TX

Lindbergia mexicana

Stems **sparsely** branched; leaves **±obtuse**; capsules **immersed**; SE

Cryphaea ravenelii

Shoots **±complanate**; costa single and **stout**; large **patch** of **quadrate** alar cells; SC, GC

Stereophyllum

Shoots **neither** julaceous **nor** complanate.

Leaf apices **rounded-obtuse**; cells oval; calcareous areas on bark, rocks; CO

Leptodon smithii

Leaf apices **acute** to **acuminate**.

Leaf cell walls strongly **sinuose/nodulose** throughout; WS

Racomitrium

Leaf cell walls strongly **pitted**, especially at bases & apices of leaves; NW

Pseudoleskea[†]

Leaf cell walls **straight** & smooth.

Upper leaf cells **>2:1**; basal cells at insertion usually **enlarged** and **yellowish**.

Costa **>35μ** at base; yellowish cells usually in **2-3** rows; WS

Hygroamblystegium tenax[†]

Costa **<35μ** at base; yellowish cells usually in a **single** row; WS

Amblystegium varium[†]

Upper leaf cells **1-2:1**.

Costa **subpercurrent** (>2/3 the leaf length).

Costa strongly **flexuose** above; leaves coarsely **serrate** above; S

Herpetineuron toccocae

Costa stout & **toothed** at back; leaves **serrate** above; shoots **±bipinnate**; CA

Bestia longipes

Costa **±straight**; leaves **±entire**.

Cells **±papillose**; alar cells **±undifferentiated**; paraphyllia **sparse**; E, OR

Leskea[†]

Cells **smooth**; alar cells **±quadrate/oblate**; paraphyllia **lacking**; N, W

Pseudoleskeella

Costa **1/3 – 2/3** the leaf length.

Leaf apex **obliquely asymmetric**; periodically **flooded** bark; NW, NB

Myrinia pulvinata

Leaf apex **symmetric** and acute to acuminate; quadrate/oblate alar cells.

Alar cells in **numerous** rows; on **bark** primarily; SE, OH

Clasmatodon parvulus

Alar cells in a **few** rows; on **rock** primarily; N, W

Pseudoleskeella

Costa **<1/3** the leaf length, **variable** & commonly **forked**; N, W

Pseudoleskeella

Costa **short** and **double** or none.

Shoot **±julaceous**; leaves **ovate** with an **apiculus**; arctic-alpine; NW

Myurella tenerrima[†]

Shoots usually **±complanate**; leaves **±acuminate**; cells **lax** and **translucent**; FL

Vesicularia vesicularis

Shoots **neither** julaceous **nor** complanate.

Stem leaves with a **setaceous** point; alar cells **±undifferentiated**; NW, OR

Iwatsukiella leucotricha

Stem leaves **±acuminate**; alar cells **±quadrate/oblate** in **several** rows; N, W

Pseudoleskeella

[#] Cells with low papillae or short projections.

Cells = medial, laminal cells; cells ~2/3 of the way from insertion to apex, midway between the costa and the margin.

Length to breadth **ratios** of medial, laminal cells:

Long cells: >8:1; commonly termed linear or linear-flexuose.

Intermediate cells: 3-8:1; commonly termed elongated, oblong-rhomboidal, fusiform., or elliptical.

Short cells: <3:1; commonly termed isodiametric, quadrate, rounded-quadrate, or rhombic.

End.