Utah’s Mosses
Illustrated Keys to the Genera

Excerpted and modified from
Edited by A.H. Holmgren. Brigham Young University Press.
Preface

The keys and illustrations presented here are taken almost completely from Flowers, S. 1973. Mosses: Utah and the West which was edited for publication after his death by Arthur H. Holmgren. Brigham Young University has agreed to their being made available in this document via the web. Two of the illustrations, those of Schistidium atrichum and Meiotrichum lyallii, are from Flora of North America, volume 27 and are reproduced with permission of the Flora of North America Association and were prepared by Dr. P.M. Eckels.

I developed this document to provide students in a second year class at Utah State University with a resource for identifying mosses. The goals of the class are to make students more aware of the plants and fungi in their environment and how their structure determines and affects their role in an ecosystem. As part of the class, they are asked to collect and identify a few flowering plants, bryophytes, and fungi. Providing this document for their work with mosses helps keep the cost of the course within bounds while providing students with a strong foundation for further study.

Flowers work was published in 1973, almost 40 years ago. There have been additional mosses discovered in Utah since then and modifications made in the taxonomy of those that he did treat. Modifying his keys to reflect these changes requires a knowledgeable bryologist which I am not. I have modified the key to the genera of the Polytrichaceae based on the treatment in FNA 27 but otherwise the taxonomy is unchanged. Dr. William A. Weber summarized changes made by 2003 in “Seville Flowers Mosses: Utah and the West. Nomenclatural clarifications and updates” (Evansia 20:1-9). I urge all users to consult the original volume, Weber’s article, and the bryophyte volumes of Flora of North America when identifying a moss from Utah. In addition, specimens can be sent to me at the Intermountain Herbarium of Utah State University (address below). We will image the specimen, post the collection information to intermountainbiota.org, and make the specimens available for study by others. For instructions on collecting bryophytes and lichens, see http://heritage.nv.gov/mosses/collect.htm.

I thank Dr, John Brinda of the University of Nevada - Las Vegas for drawing attention to Weber’s publication, suggesting that I adopt the treatment of Polytrichaceae in FNA 27, and for pointing out some errors in the original version of this document; Dr. John R. Spence for suggestions that make the keys somewhat clearer; and Dr. Richard Zander for his comments on the format. All errors are my responsibility. I shall correct them as they come to my attention.

Mary E. Barkworth 8 July 2011
Intermountain Herbarium
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Bryophyta
Gametophytes having conspicuous, green, leafy stems and filamentous, septate rhizoids. Stems simple or branched. Leaves mostly 1-celled thick, usually with a cost 2-several cells thick. Sex organs in terminal or lateral buds; plants synoecious, monoeious, or dioecious; antheria composed of a short stalk and an oval or clavate sac 1 cell thick in which several sperm develop; archegonia composed of a short stalk, a swollen base containing one egg and an elongated neck, the archegonium wall 1-cell thick. Sperm swim through water to fertilize the egg and form a zygote, the first cell of the sporophyte. Sporophyte long lasting, developed \textit{in situ}, comprising a seta that terminates in a capsule. Capsules usually composed of three parts, a basal sterile neck, the middle, spore-containing portion or theca and a terminal operculum. Peristome teeth form at the top of the theca, inside (below) the operculum.

1a. Plants whitish to whitish green, often tinged with red, pink, or brown; branches whorled and persistent or leaves green in the lower half and clear in the upper half ........................................ 2

1b. Plants greenish or yellowish to dark green or blackish, branched unbranched; branches never whorled; leaves never green on the lower half and colorless and translucent on the upper half ....................................................... 3

2a. Plants growing in bogs or on the banks of streams and lakes; stems more than 10 cm long, soft, branched; branches whorled, crowded nears the tops of the stems; plants whitish green, often tinged red, pink, or brown; leaves uniform in color; known (in Utah) only from the high Uintas. \textit{Sphagnum} ........................................ 2

2b. Plants growing on dry or moist soil, rocks, walls, and crack in cement; stems to 1 cm long, sometimes branched but the branches not whorled; plants whitish, not tinged with red, pink, or brown; leaves green on the lower portion, colorless in the upper portion; probably widespread in Utah .........................

3a. Shoots (stems with leaves) flat; leaves distichous or appearing so .......................................................................................................................... 4

3b. Shoots not flat; leaves not appearing distichous ................. 8

4a. Leaves apparently attached edgewise to the stem, split at the base and clasping the stem .............................................. \textit{Fissidens}

4b. Leaves evidently basally attached to the stem, usually not clasping it .................................................................................. 5

5a. Leaves linear subulate, distal portion abruptly diverging from their oblong and clasping base; shoots erect ........ \textit{Distichium}

5b. Leaves obovate to oblong or ovate-lanceolate, not clasping the stem at the base; shoots creeping and prostrate .......... 6

6a. Prostrate shoots not branched; leaves widely spaced, becoming gradually smaller towards the tips of the stems; leaf margins usually distinct, their cells linear and thick-walled ..... 

6b. Prostrate shoots branched; leaf margins not distinct, their cells little different from the inner cells ......................... 7

7a. Costa lacking or short and double; leaves usually ovate-lanceolate; leaf cells mostly linear; setae long; capsules cylindric, curved; plants of damp or wet soil and rocks ........................................

7b. See next page
7b. Costa long and single or short and double; leaves oblong; leaf cells rhomboidal to hexagonal; setae short; capsules oblong to cylindric, erect and straight; plants on dry or damp rocks and bark of trees ................................................................. Neckera

8a. [From 3b] Plants dark to blackish green, submerged or floating; stems often denuded towards the base ........................................ 9

8b. Plants of various shades of green but if blackish growing on dry rocks or trees ................................................................. 12

9a. Leaves in 3 rows, with or without a costa; stems often stringy towards the base ................................................................. 10

9b. Leaves in more than 3 rows; costa always present ............. 11

10a. Leaves diverging all around the stem, ovate-lanceolate to lanceolate, without a costa ......................... Fontinalis

10b. Leaves bent and to one side of stem, narrowly lanceolate to lanceolate-subulate, costate; costa slender, percurrent or excurrent .................................................. Dichelyma

11a. Shoots pinnately branched, prostrate and creeping; leaves lanceolate; setae long; capsules inclined and asymmetric ............................................................... Amblystegium

11b. Shoots not pinnately branched, in loose or dense tufts; leaves broadly ovate to ovate-lanceolate or ligulate; setae short; capsules erect and symmetric or nearly so; plants aquatic to semi-aquatic [included in Grimmia by Flowers] .... Schistidium

12a. Plants 4-9 cm tall, treelike, with erect secondary stems arising from underground stolons and bearing a dense cluster of branches at the summit ............................................ Climacium

12b. Plants usually less than 4 cm tall, not treelike .................. 13

13a. Plants pleurocarpous; stems regularly to irregularly branched, creeping and anchored by rhizoids from the underside or ascending to erect, especially if growing in water or very wet places; sporophytes from budlike lateral branches. 14

13b. Plants acrocarpous; stems erect to ascending; branches mostly erect, anchored at the base; sporophytes terminal on the main stem or well-developed branches ....................... 15

14a. Leaf cells short, smooth or papillose; peristome teeth without fine transverse lines on the lower portion; plants dull or yellowish green (go to page 9) ........................................... Leskeaceae

14b. Leaf cells mostly longer and smooth, oblong-rhomboidal to long-linear or, if short, the plants bright green; peristome teeth with fine transverse lines on the lower portion (go to page 10) .................................................. Hypnaceae

Key to acrocarpous mosses starts on next page with lead 15.
The remainder of this key applies to acrocarpous mosses. If your moss is pleurocarpous, go back to lead 13.

15a. Gametophytes coarse, 1-10 cm tall, dark green; leaves 4-12 mm long, crisped or erect, stiff and wiry when dry, oblong-lanceolate to lanceolate-ligulate .................................................. 16

15b. Gametophytes small to medium sized, variously green; leaves varied but, if large, broad and obovate to ligulate ................. 17

16a. Costa with longitudinal lamellae on the upper side; capsules angular or round, often elongate, erect, inclined, or horizontal; peristome teeth 32-64, very short, ligulate, not jointed, attached to an epiphragm (go to page 12) ........ Polytrichaceae

16b. Costa not bearing lamellae; capsules never angled, ovoid to ovoid-oblung, inclined; peristome teeth 16, jointed, with an inner peristome of numerous cilia ................................. Timmia

17a. Upper leaf cells oblong to linear, length at least 3 times the width .............................................................................................................. 18

17b. Upper medial leaf cells isodiametric to shortly obovate, length less than twice width ................................................................. 28

18a. Leaf cells papillose because of projecting end walls; leaf margins usually serrate; capsules globose to shortly ovate, inclined, furrowed when dry ................................................... 19

18b. Leaf cells smooth ........................................................................ 20

19a. Leaves subulate, abruptly diverging from an oblong, clasping based; costa occupying nearly the whole width of the upper part of the blade; shoots never with a whorl of sterile branches below the sporophyte ........................................ Bartramia

19b. Leaves ovate-lanceolate to triangular-lanceolate, straight or falcate-secund, base not differentiated but often plicate; costa slender, percurent to excurrent; shoots often with a whorl of sterile branches below the sporophyte .......................... Philonotis

20a. Ferruginous rhizoids forming a tomentum and usually covering the shoots to near the tip; leaves narrowly lanceolate to subulate from a broad base, with a single fold on each side; capsules rare, globose to shortly obovate, thin-walled, finely wrinkled when dry; peristome lacking ........................................ Anacolia

20b. Ferruginous rhizoids absent or, if present and dense, usually confined to the base of the shoots .............................................. 21

21a. Leaves usually widest above the base, broadly elliptical, obovate, or ligulate, usually acute; cells mostly rhomboidal to hexagonal ......................................................................................... 22

21b. Leaves broadest at the base ........................................................................ 25

22a. Leaf margins formed of linear, thick-walled cells....... Bryum

22b. Leaf margins not formed of linear cells .................................. 23

23a. Capsules ovoid to ovoid-cylindric, unchanged when dry, abruptly narrowed below to a long, necklike hypophysis which tapers gradually into the seta; hypophysis wrinkled when dry; outer cells of the capsule transversely elongate, very thick walled; peristome teeth divided to the base into 32 linear divisions, often tangled or broken .................. Tayloria

23b. Capsules pyriform, without a hypophysis; outer cells of the capsules vertically elongate; peristome lacking or, if present, the teeth not divided ......................................................... 24

24a. Peristome lacking; capsules with a short neck, symmetric, shortly pyriform or ovoid-pyriform ............... Physcomitrium

24b. Peristome present; capsules with a long neck, symmetric and elongate-pyriform or asymmetric, at least the neck furrowed to irregularly wrinkled when dry ......................................... Funaria
25a. [From 21b] Leaves linear-subulate from a broad base; costa occupying nearly the entire width of the blade; capsules 1.5-2 mm long, slenderly pyriform, slightly gibbous with a long, slender neck; plants annual .................................. Leptobryum

25b. Leaves lanceolate-ovate to oblong; costa slender .................... 26

26a. Leaf cells mostly rhomboidal to hexagonal, the marginal cells much longer, narrower and thicker walled forming a more or less distinct border; capsules inclined to pendant, short to long pyriform or clavate, straight to slightly incurved... Bryum

26b. Leaf cells mostly narrowly hexagonal to linear, shorter in a few species, the marginal cells not distinctly narrower nor forming a distinct border........................................ 27

27a. Capsules inclined to pendant, short to long pyriform; peristome double, teeth lanceolate; plants on soil, rock, or wood, widespread .......................................................... Pohlia

27b. Capsules erect, elongate-pyriform; outer peristome teeth lacking; endostome of linear-subulate segments from broadened bases; plants rare, on wet limestone rocks and cliffs .................................................. Mielichhoferia

28a. [From 17b] Leaf cells smooth................................................ 29

28b. Leaf cells papillose .................................................................. 39

29a. Plants dark to blackish green, often white-tipped, forming dense cushions or tufts on dry rocks; seta short straight or arcuate; capsules immersed to shortly exserted........ Grimmia

29b. Plants of various shades of green but rarely blackish green but, if so, growing on soil or in crevices................................. 30

30a. Alar cells enlarged and inflated, at least in some leaves.... 31

30b. Alar cells neither enlarged nor inflated............................... 32

31a. Leaves strongly crisped when dry, broadly dilated at the base; capsules common, cylindric, curved and asymmetric, strumose.................................................. Oncophorus

31b. Leaves not crisped when dry, straight to falcate, often secund, base not dilated; capsules rare........................................ Dicranum

32a. Leaves ovate-lanceolate to slenderly lanceolate ............ 33

32b. Leaves broadest near the middle or more distally, bases more or less narrowed ................................................. 35

33a. Capsules rare (in Utah species); leaves sometimes moderately crisped when dry; plants usually on dry or wet soil and rocks [illustration bottom right] .................................. Didymodon

33b. Capsules often present; leaves strongly crisped when dry.... 34

34a. Capsules cylindric, strumose, erect when moist, horizontal and longitudinally sulcate when dry; teeth divided into 2 strongly jointed prongs; plants of moist or dry soil or downed logs [illustration below] ...................... Ceratodon
34b. Capsules shortly oblong to cylindrical, not strumose, erect and smooth when dry; teeth entire to irregularly divided into weakly jointed, linear divisions; plants of dry rocks and fallen tree trunks................................. *Dicranoweisia*

35a. Plants medium sized to large, mostly in dry or wet, shady places of foothills and mountains.......................... 36
35b. Plants small, on dry soil, in foothills and valleys........... 37
36a. Leaves elliptical, obovate, oblong, or oblong-lanceolate, tips acute to broadly rounded, bases more or less strongly narrowed; margins entire to strongly toothed, usually formed by narrow, thick-walled cells; costa not to shortly excurrent; capsules oblong to pyriform, pendent or horizontal; teeth lanceolate, not divided .................................................. *Mnium*

36b. Leaves spatulate to oblong-lanceolate, tips acute to shortly acuminate, margins entire, not bordered; costa excurrent as a yellowish point; capsules cylindric, erect; teeth divided into 32 spirally twisted, hairlike divisions ....... *Tortula mucronifolia*

37a. Leaves without hair points; costa thick, wide from base to tip; margins of the blade strongly involute.......................... *Aloina*
37b. Leaves with white hair points; costa wide distally; margins not involute .......................................................... 38

38a. Costa bearing simple or branched green filaments on the upper side, these from short and few to long and dense, often spreading laterally over the blade; capsules cylindric, long exserted, erect; peristome of 32 spirally twisted, hairlike divisions .............................................................. *Crossidium*

38b. Costa bearing 2-4 lamellae on the upper side, these sometimes with green filaments on their surface and appearing as a dense, opaque, granular mass; capsules immersed to well exserted, globose to ovoid or cylindric; peristome lacking or fragile and difficult to observe................................. *Pterygoneuron*

39a. [From 28b] Margins of the leaves involute; plants small ...... 40
39b. Margins flat or revolute .............................................. 41

40a. Capsules with a rostrate operculum ......................... *Weissia*
40b. Capsules without or with a rudimentary operculum, splitting open irregularly .................................................. *Astomum*

41a. Leaves widest near the middle or more distally .......... 42
41b. Leaves widest at the base, ovate to narrowly lanceolate .... 48

42a. Leaf margins finely to coarsely serrate distally; cells with a single large, conical papilla in the middle; leaves shortly oblong-ligulate to lanceolate, tips widely acutely to broadly rounded; capsules rare [illustration below] ......... *Dichodontium*
42b. Leaf margins entire; papillae smaller, usually 2 or more on each cell, sometimes weak or lacking, frequently C-shaped or O-shaped .......................................................... 43
43a. Leaves bordered by larger, often orange, cells; plants sub-
merged or on wet rocks in limestone regions; capsules rare
............................................................................................................ Scopelophila
43b. Leaves not ordered with larger cells; capsules common ...... 44
44a. Plants less than 1 cm tall; leaves ovate to obovate or oblong-
lanceolate to ligulate, tips acute to shortly acuminate; plants
usually growing on soil ................................................................. 45
44b. Plants small to large; leaves usually oblong to ligulate, tips
acute to broadly rounded, often with hyaline hair points ..... 46
45a. Plants yellowish green; capsules ovoid, immersed or project-
ing horizontally between the perichaetial leaves; operculum
not differentiated................................................................. Phascum
45b. Plants green; capsules shortly oblong to cylindric, exerted,
erect; operculum sometimes formed................................. Pottia
46a. Calyptra large and persistent, yellowish, covering half or more
of the capsule; capsules erect, cylindric, emergent to shortly
exserted, smooth or longitudinally furrowed when dry
................................................................................................. Encalypta
46b. Calyptra small, thin, and falling early - so seldom seen ...... 47
47a. Peristome teeth 16, divided into 2-3 slender prongs, straight
or slightly twisted from a low basal membrane; capsules ovoid
or oblong to cylindric................................................................. Desmatodon
47b. Peristome teeth 16, divided into 32 long, hairlike divisions,
strongly spirally twisted, usually from a high, tessellated basal
membrane; capsules cylindric.......................................................... Tortula
48a. [From 41b] Leaf margins toothed at the base .......... Eucladium
48b. Leaf margins entire or toothed above the base .......... 49
49a. Stems often prolonged as pseudopodia bearing green gemmae
on the sides or in a globose cluster; leaves serrate to nearly
entire ......................................................................................... Aulocomnium
49b. Stems not forming pseudopodia; leaf margins various ...... 50
50a. Hyaline basal cells extending up the leaf margins in a V-
shape; leaves strongly crisped when dry [illustration below
left] ............................................................................................... Tortella
50b. Hyaline leaf cells not extending up the margins .......... 51
51a. Plants reddish except at the green tips; capsules common,
oblong to cylindric, erect and symmetric; leaves obscurely to
coarsely toothed at the extreme tip [illustration below right]
......................................................................................... Bryoerythrophyllum
51b. Plants yellow brown, or blackish below, rarely reddish ...... 52
52a. Capsules immersed to shortly exserted, globose to cylindric, smooth or longitudinally furrowed when dry; teeth 16, triangular lanceolate, usually in 8 pairs; plants dark green, olivaceous or blackish; leaves usually oblong-lanceolate to lanceolate; plants on dry rocks or tree bark ... Orthotrichum

52b. Capsule long exserted; teeth usually divided into slender divisions ................................................................. 53

53a. Plants short or tall and slender, forming dense cushions or expanded sods on wet, limy cliffs or rocks, light or bluish green on the surface; leaves oblong to linear-lanceolate, acute or blunt, not crisped when dry; margins flat or revolute towards the base; capsules oblong, erect; peristome lacking ........................................................................................................... Gymnostomum

53b. Plants mostly medium sized, bright to dark green ........... 54

54a. Leaves linear-lanceolate to narrowly ligulate from an oblong base; margins flat, entire to irregularly notched above; tips acute; plants mostly on shaded soil or rocks and in crevice ................................................................................................................ Trichostomum

54b. Leaves ovate-lanceolate to lanceolate; margins revolute; tips narrowly acute or broader above and obtuse; plants on wet or dry soil, rocks, or cliffs ................................................................. 55

55a. Peristome teeth short and straight, variously cleft to divided ................................................................. Didymodon

55b. Peristome teeth divided into 32 spirally twisted, hairlike divisions from a very short basal membrane .......... Barbula

**LESKEACEAE**

1a. Plants usually in deep, dense, erect tufts on wet soil; shoots regularly pinnate; paraphyllia dense, filamentous and much branched; stem leaves with long, branched paraphyllia on the basal margins ................................................................. Helodium

1b. Plants forming mats and tufts on dry rocks or bases of trees, rarely on soil; paraphyllia from numerous to entirely lacking, never present on leaves .................................................................................. 2

2a. Apical cells of the branch leaves papillose; paraphyllia abundant, filamentous and branched ................................ Thuidium

2b. Apical cells of the branch leaves smooth or low papillose; paraphyllia lacking or short and unbranched ................... 3

3a. Paraphyllia short, not branched (illustration below) Lescuraea

3b. Paraphyllia lacking (illustration below) .................... Leskeella

**Above:** Leskeella tectorum

Flowers p. 401

Lescuraea incurvata

Flowers p. 404

Lescuraea patens

Flowers p. 404
HYPNACEAE

1a. Costa lacking or short and double of forking with 1 fork reaching the middle of the leaf............................................. 2
1b. Costa usually single and reaching the middle of the leaf or beyond (often forked in some leaves of *Hygrohypnum*) .......... 8
2a. Leaves complanate; costa lacking or very faint. *Plagiothecium* ................................................................. 3
2b. Leaves not complanate.......................................................... 4
3a. Plants aquatic; leaves broadly ovate or ovate-lanceolate, falcate secund; branches often julaceous........... *Hygrohypnum* 3b. Plants not aquatic........................................................................ 5
4a. Leaves squarrose to recurved............................................. *Campylium* 4b. Leaves not squarrose or recurved........................................... 6
5a. Leaves usually falcate to circinate (straight in one species); capsules usually curved to arcuate.................. *Hypnum* 5b. Leaves straight; capsules erect and symmetric................................. 7
6a. Plants minute; leaves less than 0.5 mm long, in thin mats on the base of trees............................................ *Platydictya* 6b. Plants small to medium sized; leaves more than 0.5 mm long ........................................................................ 8
7a. Branches usually bearing numerous small, deciduous branches with tiny leaves in the axils of the upper leaves; capsules cylindric; peristome without cilia.......................... *Platygyrium* 7b. Branches without deciduous branches; capsules ovoid to oblong; peristome cilia single, well-developed .... *Orthothecium* 8a. Gametophytes to 10 cm tall, with erect secondary branches arising from horizontal underground shoots bearing a dense cluster of branches at their tips ....................... *Climacium* 8b. Gametophytes small to medium sized, never with secondary branches bearing a dense cluster of branches at their tips .......... 9
9a. Leaves lanceolate, plicate with 1-2 strong folds extending to the top; plants yellowish green when dry ....................... 10
9b. Leaves flat or, if plicate, the folds short, not continuous to the tip; plants variously colored................................. 11
10a. Plants growing on dry rocks and trees; branch tips curved when dry; capsules erect and symmetric, peristome cilia rudimentary or lacking; plants montane........... *Homalothecium* 10b. Plants of bogs at high elevations; branch tips straight even when dry; capsules curved, asymmetric; peristome cilia well developed........................................... *Tomenthypnum* 11a. Branches strongly julaceous, usually hooked at the tips when dry; leaves from almost round to oblong, very concave, obtuse to apiculate (illustration below).................. *Scleropodium*
11b. Branches not julaceous or, if so, small and slender; leaves varied
........................................................................................................12
12a. Leaves of the main stem and branches differing in shape and size; capsules usually short and thick, inclined and asymmetric, not or only slightly contracted below the mouth when dry
........................................................................................................13
12b. Leaves of the main stem and branches similar; capsules usually cylindrical, curved and usually strongly contracted under the mouth when dry
........................................................................................................14
13a. Tips of the branch leaves acute to broadly obtuse, their apical cells rhomboidal to rounded, much shorter than the linear median cells; operculum rostrate
........................................................................................................14
13b. Tips of the branch leaves usually acuminate, the apical cells not much different from the linear median cells; operculum conic to shortly rostrate
........................................................................................................14
14a. Stems usually with abundant paraphyllia; leaves usually falcate secund
........................................................................................................15
14b. Stems without paraphyllia or with a few, inconspicuous paraphyllia
........................................................................................................15
15a. Leaves usually broad at the tip, blunt to broadly rounded, sometimes apiculate
........................................................................................................16
15b. Leaves usually acute to tapering or acuminate
........................................................................................................17
16a. Branches julaceous; alar cells enlarged and inflated
........................................................................................................16
16b. Branches not julaceous or, if so, the alar cells not or only moderately enlarged; costa forked in some species
........................................................................................................16
17a. Leaves usually falcate to circinate but straight in some forms, usually secund, shortly to long and slenderly acuminate; plants mostly aquatic
........................................................................................................17
17b. Leaves straight
........................................................................................................17
18a. Plants small; median cells short (illustration below)
........................................................................................................18
18b. Plants medium-sized; median cells longer
........................................................................................................19
19a. Leaves strongly divergent to squarrose; plants of damp to wet places (illustration below)
........................................................................................................19
19b. Leaves divergent to ascending
........................................................................................................19
20a. Leaves long acuminate; paraphyllia often present, at least on the stems; plants of damp to wet places (illustration in right hand column)
........................................................................................................20
20b. Leaves not long acuminate; plants aquatic (illustration below)
........................................................................................................20
POLYTRICHACEAE

The following two keys differ in being based on the treatment of the family by G.L.S. Merrill in Flora of North America 27: 121-161. Most of the illustrations are from Flowers but that of Meiotrichum lyallii is from FNA. It was drawn by Dr. P. Eckel.

**Key 1: For plants with calyptra and capsules**

1a. Calyptras glabrous or sparsely hispid at the top ............... 2
1b. Calyptras densely hairy .................................................. 3

2a. Lamellae 2-6, confined to the middle portion of the leaf width; capsule terete ........................................... Atrichum
2b. Lamellae more than 10, occupying most of the leaf width; capsule bilaterally compressed, 4-angled, the upper two angles more prominent and forming a crest ........ Meiotrichum

3a. Capsules bluntly 4(6)-angled or rounded its epidermal cells without pits or with a diffuse thin spot; peristome teeth not keeled .................................................................. Polytrichastrum
3b. Capsules sharply angled or winged, particularly in age, its epidermal cells bulging, with a well-defined pit; peristome with a thin vertical keel on the inner surface ......................... Polygonum

**Key 1: For plants in vegetative condition**

1a. Lamellae 2-6, confined to the middle portion of the leaf width, loosely spreading and wavy ...................... Atrichum
1b. Lamellae 20 or more, occupying most of the leaf width, compact and straight ......................................................... 2

2a. All cells of the lamellae equally thick walled .......... Polytrichum
2b. Apical cells of the lamellae with thicker walls than those below ........................................................................ 3

3a. Junction of the leaf sheath and limb well differentiated, the shoulders with well developed "hinge tissue" .................................................. Polytrichastrum
3b. Junction of the leaf sheath and limb not well differentiated, shoulders lacking "hing tissue" ...................... Meiotrichum

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