Preliminary Guide

to the

Bryophytes

of

New Mexico

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Note: This is a work in progress, with omissions and errors yet to be added or corrected.
INTRODUCTION
KEYS TO THE MOSSES OF NEW MEXICO

Adapted from the following:

1 Leaf cells arranged in a network of narrow green cells alternating with large hyaline cells; branches arranged in radiate clusters toward the apex of the stem, the stem terminated by a head-like cluster of short branches .................................................. Sphagnum (Sphagnaceae)

1 Leaf cells and branches not both as above

2 Leaves attached in two obvious rows on opposite sides of the stem (distichous or appearing so) ................................................................. Group A

2 Leaves attached all around the stem (foliate stems sometimes flattened)

3 Leaves with lamellae or filaments on the adaxial (upper) surface of the costa (excluding propagula or gemmae) ..................................................................... Group B

3 Leaves without lamellae or filaments on the adaxial surface of the costa (but propagula or gemmae sometimes present)

4 Plants acrocarpous (sporophytes terminal); stems erect, mostly not branched or occasionally branched beneath inflorescences ........................................ Group C

4 Plants pleurocarpous (sporophytes lateral); stems mostly prostrate with lateral branches, often mat-forming................................................................. Group D

Group A: Leaves attached in two obvious rows on opposite sides of the stem (distichous or appearing so)

1 Leaves appear to be arranged on edge to the stem and split at the base, consisting of two vagrant laminae which clasp the stem and base of the leaf above (equitant) .................................................. Fissidens (Fissidentaceae)

1 Leaves not on edge to the stem or split at the base

2 Leaves linear-subulate, abruptly divergent from an oblong claspng base, in 2 opposite rows; shoots plumose and delicate ........................................ Distichium (Ditrichaceae)

2 Leaves obovate to oblong or ovate-lanceolate, not clasping at the base, in several rows but twisted to appear as if in 2 rows; shoots variously disposed

3 Shoots acrocarpous, erect .................................................. Bryoxiphium (Bryoxiphiaceae)

3 Shoots pleurocarpous, prostrate, creeping, or stoloniferous

4 Prostrate shoots not branched; leaves distant and becoming gradually smaller toward the end of the stem; margins mostly bordered with a limbidium.... Plagiomnium (Mniaceae)

4 Prostrate shoots variously but obviously branched; leaves overlapping; margins not bordered

5 Costa long and single .................................................. Neckera menziesii (Neckeraceae)

5 Costa short and double or lacking

6 Capsules immersed; flagilliform branches often present; basal cells not pitted; lamina undulate when dry ........................................ Neckera pennata (Neckeraceae)

6 Capsules on long setae; flagilliform branches absent; basal cells pitted; lamina usually not undulate when dry (sometimes faintly so) .................................................. Plagiothecium (Plagiotheciaceae)

Group B: Leaves with lamellae or filaments on the adaxial (upper) surface of the costa (excluding propagula or gemmae)

1 Leaves with filaments on the adaxial surface of the costa

2 Leaf margins broadly inrolled (and mostly obscuring the filaments) ........ Aloina (Pottiaceae)
1 Leaves with lamellae on the adaxial surface of the costa

2 Leaves bordered on the margins with elongate cells .............................................. Attrichum (Polytrichaceae)

3 Leaves without elongate, marginal cells

4 Lamellae 2–4; leaves hyaline-awned; plants small, less than 5 mm tall; peristome none or rudimentary and fragile .............................................. Pterygoneurum (Pottiaceae)

4 Lamellae 4–50; leaves mostly not awned; plants mostly larger; peristome of 32 or 64 persistent teeth ................................................................. POLYTRICHACEAE

Group C: Plants acrocarpous (sporophytes terminal); stems erect, not branched or occasionally branched beneath inflorescences

1 Plants with obvious gemmae- or brood-bearing structures at the ends of some stems

2 Gemmae clusters produced inside broad leafy cups, or in dense axillary clusters

3 Gemmae or brood bodies in leafy cups or in dense axillary clusters

3 Gemmae clusters produced inside broad leafy cups terminating the stems; leaves broadly elliptic, pellucida when wet.............................................. Tetraphis (Tetradiaceae)

3 Gemmae and terminal cups absent, but brood branchlets or clusters of brood leaves produced among the apical leaves; leaves narrowly lanceolate to nearly linear

4 Propagula of tiny brood branchlets produced near the ends of the stems, looking like tiny stems with leaves .............................................. Dicranum montanum (Dicranaceae)

4 Propagula of tiny leaves produced in dense axillary clusters toward the ends of the stems, looking like little pom-poms.............................................. Brothera (Dicranaceae)

1 Plants lacking special gemmae-bearing structures at the ends of the stems

5 Leaves glaucous blue-green, with a fine, white, cobwebby covering (actually a filamentous coating but often appearing as a powdery coating) ........................... Saelania (Dirichilaceae)

5 Leaves not as above

6 Plants blackish or dark brown and quite brittle, strongly affixed to acidic rocks and boulders at elevations higher than 8500 ft

7 Leaves bordered on the margins with elongate cells .............................................. Crossidium (Pottiaceae)

7 Costa absent (in our species); capsule opening by four longitudinal slits extending the length of the capsule and bowing out when mature, resembling a Chinese lantern; peristome absent ...................................................... Andreea (Andreaeaceae)

7 Costa present, prominent; capsule opening by the dehiscence of an apical cap (operculum), revealing the teeth of the peristome .............................................. GRIMMIACEAE

8 Plants tiny, the stems ephemeral, 1-2(5) mm long, on soil; capsules spherical, immersed, lacking a dehiscent operculum and rupturing when mature (cleistocarpous)

9 Leaves with lamellae on the adaxial surface of the costa .............................................. Leptobryum (Leptobryaceae)

9 Leaves papillose .............................................. Tortula acaulon (Pottiaceae)

9 Leaves smooth

10 Capsule apiculate; aerial stems arising from underground rhizomes; plants ± terete ...................................................... Lorentziella (Gigaspermaceae)

10 Capsule lacking an apiculus; aerial stems unattached; plants 3angled at maturity .............................................. Acaulon (Pottiaceae)

8 Plants larger, the stems often more than 5 mm long and/or persistent, on various substrates; capsules usually elongate, immersed to exerted, with a dehiscent operculum

11 Leaf cells smooth, neither papillose, prorate, nor bulging-mammilllose..... Group C-1

11 Leaf cells papillose, prorate, or bulging-mammilllose ................................. Group C-2

Group C-1: Plants acrocarpous; leaf cells smooth

1 Alar cells well-developed, usually larger and often colored............................... DICRANACEAE

1 Alar cells not clearly differentiated

2 Plants typically in dark green to blackish tufts or mats, often hoary from hyaline hair-points, usually on rock ...................................................... GRIMMIACEAE

2 Plants lighter green, not hoary, on various substrates

3 Leaf cells long-rectangular to linear

4 Leaves ovate-lanceolate to linear; axillary hairs absent or lacking red club-shaped bases .............................................. Leptobryum (Meesiaceae)

4 Leaves long-subulate to setaceous; axillary hairs present and with conspicuous red club-shaped bases ...............................
5 Leaves flexuose, falcate-secund when wet.......................**Dicranella** (Dicranaceae)
5 Leaves not flexuose nor falcate-secund when wet
6 Distal leaf cells mostly linear; margin lacking a limbidium..............................................**Pohlia** (Mielichhoferiaceae)
6 Distal leaf cells long-rhomboideal; margin with a strong limbidium..............................................**Gemmabryum** (Bryaceae)

3 Leaf cells isodiametric, quadrate, to short-rectangular
7 Leaves with a strongly sheathing base
8 Sporophytes single; capsules strumose, somewhat furrowed when dry; leaves a dirty brown-gray when viewed in preparation through the microscope (at least *O. wahlenbergii*); ..............................................**Oncophorus** (Dicranaceae)
8 Sporophytes clustered; capsules not strumose nor furrowed when dry; leaves clear yellow when viewed in preparation through the microscope ..............................................**Symblepharis** (Dicranaceae)

7 Leaves without a sheathing base
9 Distal leaf cells mostly isodiametric to squarriish, never more than 2:1
10 Leaf margins bordered by a limbidium of elongate cells ..................**MNIACEAE**
10 Leaf margins not so bordered
11 Leaves widest above the middle ..............................................**Tortula** (Pottiaceae)
11 Leaves lanceolate to ovate, widest below the middle
12 Distal laminal cells (excluding margin) bi-stratose in strips..............................................**Pychomitrium** (Psychomitriaceae)
12 Distal cells (excluding the margin) uni-stratose throughout
13 Margins bi-stratose ..............................................**Dicranoweisia** (Dicranaceae)
13 Margins uni-stratose
14 Leaf margins plane
15 Costa percurrent to usually strongly excurrent ..........................**Ditrichum** (Ditrichaceae)
15 Costa at most percurrent ...................**Tetraphis** (Tetraphidaceae)
14 Leaf margins recurved to revolute
16 Blades with nearly parallel sides or wider distally ............
16 Blades narrowing from base to apex, wider proximally ............**Ceratodon** (Ditrichaceae)

9 Distal leaf cells rhomboidal to short-rectangular, mostly more than 2:1
17 Leaves bordered by a limbidium of elongate cells
18 Leaf cells greater than 2:1 ..............................................**BRYACEAE**
18 Leaf cells 1-2:1 ..............................................**MNIACEAE**
17 Leaves not so bordered
19 Distal portions of the leaf white, lacking chlorophyll, giving the plant a silvery appearance ..........................**Bryum Group** (Bryaceae)
19 Distal portions of the leaf with chlorophyll, the same color as the mid-leaf portion, the plants not silvery
20 Aerial stems arising from a short fleshy underground rhizome system; plants tiny, 1-4 mm high, light green to glaucous; leaves broadly ovate, concave, abruptly narrowed to a long awn; capsule immersed .....................**Lorentziella** (Gigaspermaceae)
20 Plants not as above
21 Leaves ovate to lanceolate, widest below the middle.....**BRYACEAE**
21 Leaves obovate, widest above the middle
22 Leaf margins recurved at base; axils of upper leaves beset with reddish hairs ..................**Tayloria** (Splachnaceae)
22 Leaf margins plane at the base; all leaf axils lacking reddish hairs ..............................................**FUNARIACEAE**

**Group C-2:** Plants acrocarpous; leaf cells papillose, prorate, or bulging-mamillose
1 Leaf cells bulging-mamillose on the adaxial surface, flat on the abaxial surface, but not papillose nor prorate
| Leaf cells papillose or prorate, mammilllose or not | Timmiella (Pottiaceae) |
| Lamina bi-stratose | Timmia (Timmiaceae) |
| Lamina uni-stratose |

1 Leaf cells papillose or prorate, mammilllose or not

3 Leaf cells prorate, the ends of the cell walls projecting

3 Leaf cells not prorate, but papillose over the lumen

4 Alar cells usually inflated, usually orangish or brownish; gemmae borne at the ends of naked stalks

Aulacomnium (Aulacomiaceae)

4 Alar cells not as above; gemmae-bearing stalks as above absent

5 Leaves lacking a costa

HEDWIGIACEAE

5 Leaves with a costa

6 Basal hyaline cells extending upward in a V-shaped pattern

7 Margin entire

Tortella (Pottiaceae)

7 Margin toothed

Pleurochaete (Pottiaceae)

6 Basal hyaline cells not as above

8 Leaves plane to involute on both margins

9 Margins strongly involute

Weissia (Pottiaceae)

9 Margins plane or only slightly inrolled near the apex

10 Leaves mostly widest near the middle or above

11 End cell walls of basal cells thickened, usually colored brown to reddish; calyptra large, 3-7 mm long, completely covering the capsule

Encalypta (Encalyptaceae)

11 End cells walls of basal cells neither thickened nor colored; calyptra smaller or not covering the capsule or both

POTTIAEAE

10 Leaves mostly widest below the middle

12 Basal leaf margins serrate-dentate by projecting upward angles of the cells just above the area of enlarged basal cells, otherwise entire

Eucladium (Pottiaceae)

12 Margins of leaves toothed above the base or entire

13 Basal leaf cell walls thickened; gemmae often produced in the leaf axis, but not on the leaves; plants on trees or rock

Zygodon (Orthotrichaceae)

13 Basal leaf cell walls not thickened; gemmae production and substrate various

POTTIAEAE

8 Leaves recurved to revolute, at least on one margin

14 Leaves mostly widest near the middle or above

POTTIAEAE

14 Leaves mostly widest below the middle

15 Leaves appressed and imbricated when dry; calyptra large, covering the capsule; costal stereid bands not differentiated on dry rocks or bark

Orthotrichum (Orthotrichaceae)

15 Leaves contorted or crisped when dry; calyptra small, not covering the capsule; costal stereid bands differentiated; on dry rocks or soil

POTTIAEAE

Group D: Plants pleurocarpous (sporophytes lateral); stems mostly prostrate with lateral branches, often mat-forming

1 Plants large, tree-like, with erect secondary stems bearing clusters of branches at the summit, on damp to wet soil and humus

Climacium (Climaciaceae)

1 Plants not as above

2 Plants 2- to 3-pinnate

3 Secondary fronds in raised, stair-step, horizontal layers, each frond produced on an arching branch; leaf cells linear-flexuose

Hylocomium (Hylocomiaceae)

3 Secondary fronds not as above; leaf cells rounded-quadrate to short-hexagonal

Thuidium (Thuidiaceae)

2 Plants 1-pinnate or irregularly branched

4 Plants aquatic, often completely submerged or floating, or growing over seeping rocks or attached to rocks in small streams and springs

Fontinalis (Fontinalaceae)

5 Leaves 3-ranked

5 Leaves not 3-ranked

10
Group D
1 Blade margins entire to serrulate
1 Blade margins conspicuously dentate to ciliate

Group D
1 Shoots complanate, obviously flattened
2 Capsules immersed; flagilliform branches often present; lamina undulate when dry
2 Capsules on long setae; flagilliform branches absent; lamina not undulate when dry
3 Leaves strongly decurrent, the margins usually recurved
3 Leaves not decurrent or the decurrency of 1-3 cells, the margins usually plane
4 Leaf margins mostly
7 Cells at the apex the same length as those below ... AMBLYSTEGIACEAE
7 Cells at the apex noticeably shorter than those below .................................................Rhynchostegium (Brachytheciaceae)

4 Plants and habitats not as above, some plants growing in wet meadows, fens, and marshes, but not aquatic
8 Leaf cells papillose or prorate.................................................................Rhytidium (Rhytidiaceae)
8 Leaf cells smooth, not papillose nor prorate
9 Plants very small; leaves tiny, 0.1-0.5 mm long ...........................................Group D-2
9 Plants and leaves larger
10 Costa none, short and double, or single and ending below midleaf ...... Group D-3
10 Costa single, reaching to midleaf and beyond .........................................Group D-4

Group D-1: Leaf cells papillose or prorate
1 Leaves both plicate and rugose ............................................................HEDWIGIACEAE
1 Leaves not both plicate and rugose
2 Leaves lacking a costa, tipped with a broad hyaline point; cells very strongly papillose, some elongate and branched or nipple-like; capsules sessile; growing on siliceous rocks

Group D-2: Leaf cells smooth, plants very small; leaves tiny
1 Blade margins conspicuously dentate to ciliate-dentate (rarely nearly entire) .................................................................Fabronia (Fabroniaceae)
1 Blade margins entire to serrulate
2 Leaves ± catenulate when dry (the bases perpendicular to the stem then the blade curving abruptly to lie parallel-appressed to the stem)........Pseudoleskeella tectorum (Leskeaceae)
2 Leaves not catenulate when dry, but with the bases and blades both appressed to both spreading .........................................................Platydictya (Amblystegiaceae)

Group D-3: Leaf cells smooth, costa none, short and double, or single and ending below midleaf
1 Shoots complanate, obviously flattened
2 Capsules immersed; flagilliform branches often present; lamina undulate when dry
2 Capsules on long setae; flagilliform branches absent; lamina not undulate when dry (sometimes faintly so)
3 Leaves strongly decurrent, the margins usually recurved ... Plagiothecium (Plagiotheciaceae)
3 Leaves not decurrent or the decurrency of 1-3 cells, the margins usually plane
4 Leaf margins mostly serrulate nearly to the base
5 Alar cells not differentiated or a few quadrate cells sometimes present; pseudoparaphyllia lacking .........................................Pseudotaxiphyllum (Hypnaceae)
5 Alar cells present and distinctly differentiated with several to many cells; pseudoparaphyllia present ........................................... Taxiphyllum (Hypnaceae)
4 Leaf margins mostly entire, or serrulate only distally (Isopterygiopsis often with 1-2 serrulate cells at alar region)
6 Leaves stripped from the stem bearing enlarged hyaline cortical cells .................. Breidleria (Hypnaceae)
6 Leaves stripped from the stem without enlarged hyaline cells
7 Pseudoparaphyllia present, filamentous; rhizoids smooth Isopterygium (Hypnaceae)
7 Pseudoparaphyllia absent; rhizoids papillose .................. Isopterygiopsis (Hypnaceae)
1 Shoots not flattened
8 Leaves sharply squarrose-recurved from the stem when wet, cordate-based
9 Plants small and slender; stem leaves mostly less than 1 mm long ....................................................... Campylophylum (Amblystegiaceae)
9 Plants medium-sized; stem leaves 1.5-2.5 mm long.............. Campylium (Amblystegiaceae)
8 Leaves spreading to appressed, not sharply recurved, usually not cordate-based
10 Branch tips curved upward or outward when dry; leaves mostly straight and not falcate
   (though the arrangement on the stem may be homomallous)
11 Median leaf cells 9-16:1; quadrate alar cells 5-15 along the margin
12 Brood branchlets hidden among the leaves at the stem tips (usually detached by teasing the stem tips); leaves plicate; operculum long-rostrate ................

.................................................................................. Platygrium fuscoluteum (Hypnaceae)
12 Brood branchlets absent; leaves not plicate; operculum short .............................................................. Pylaisia polyantha (Hypnaceae)
11 Median leaf cells 4-8:1; quadrate alar cells 20-25 or more along the margin
13 Capsules inclined to horizontal and asymmetric; proximal leaf margins reflexed ..
........................................................................................................ Homomallium (Hypnaceae)
13 Capsules erect to suberect and symmetric; proximal leaf margins plane to incurved .............................................................. Pylaisia selwynii (Hypnaceae)
10 Branch tips ± straight or curved downward when dry; leaves straight or falcate
15 Leaves falcate-secund, mostly acuminate ................. Hypnum (Hypnaceae)
15 Leaves straight, broadly rounded to acuminate at the apex
16 Median leaf cells oval to rhomboidal
17 Leaf cells 3:1; leaves not catenulate ....... Leptopterigynandrum (Leskeaceae)
17 Leaf cells 1-2:1; leaves catenulate ................. Pseudoleskeella (Leskeaceae)
16 Median leaf cells linear
18 Stems red; alar cells orange, thick-walled; margins incurved, causing the leaf tips to appear reflexed-apiculate ............ Pleurozium (Hyplocarpaceae)
18 Stems, alar cells, and margins not all as above
19 Plants firmly attached to wet rocks along mountain streams ................
........................................................................................................ Hygrohypnum (Amblystegiaceae)
19 Plants growing on damp soil, rocks, and bases of trees in moist woods
20 Pseudoparaphyllia present; capsules curved to horizontal (H. cupressiforme & H. vaucheri) ................. Hypnum (Hypnaceae)
20 Pseudoparaphyllia absent; capsules erect ....... Entodon (Entodontaceae)

Group D-4: Leaf cells smooth; costa single, reaching to midleaf and beyond
1 Leaves widely spreading to squarrose-recurved when wet
2 Median leaf cells oval, 1-2:1; leaf tips flat, not channeled.... Lindbergia mexicana (Leskeaceae)
2 Median leaf cells oblong-linear, 4-8:1; leaf tips channeled
3 Leaves crowded, often somewhat secund at the tips; upper cells oblong-linear, 6-8:1 (or more); alar cells gradually differentiated, subquadrate, firm-walled .............................................................. Campyiadelphus (Amblystegiaceae)
3 Leaves not crowded or secund; upper cells short-rhomboidal, 4-6:1; alar cells rather abruptly differentiated, short-oblong, not noticeably firm-walled .............................................................. Pseudocampyiium (Amblystegiaceae)
1 Leaves appressed to spreading when wet, but not squarrose (not to be confused with the out- or down-curving when leaves are falcate)
4 Leaves falcate-secund
5 Leaves straight or slightly curved, not falcate

6 Paraphyllia present, thread-like; leaves entire distally; hyalodermis absent; central strand absent...............................Palustriella (Amblystegiaceae)
6 Paraphyllia absent; leaves denticulate distally; hyalodermis present; central strand present ............................................ Sanonia (Amblystegiaceae)

5 Leaves not plicate

7 Alar cells inflated and extending nearly across the leaf base
8 Margins serrate to serrulate; leaves broadly ovate, about 2:1 ............................................................... Cratoneuron (Amblystegiaceae)
8 Margins entire; leaves ovate to lanceolate, more than 3:1 ............................................................... Drepanocladius (Amblystegiaceae)

7 Alar cells not inflated
9 Terminal cells of leaf longer than 3:1 and not much different than the lower cells; alar cells abruptly differentiated .................................. Warnstorfia (Calliopogonaceae)
9 Terminal cell of leaf 1:3:1; alar cells only gradually differentiated
10 Plants mostly growing submerged in water or on frequently submerged rocks or ground; median leaf cells mostly more than 10:1 ............................................................... Leptodictyum (Amblystegiaceae)
10 Plants growing on mesic to very wet habitats, but seldom submerged; median leaf cells seldom more than 8:1.................... Hygroamblystegium (Amblystegium)

4 Leaves straight or slightly curved, not falcate-secund

11 Shoots complanate and obviously flattened
12 Leaves ovate, more gradually narrowed to the acuminate apex; proximal cells not porose; terminal cell of costa ending in a spine....Rhynchostegium (Brachytheciaceae)
12 Leaves oblong, abruptly narrowed to the acute apex; proximal cells distinctly porose; terminal cell of costa not spinose............................ Neckera (Neckeraceae)

11 Shoots not complanate

13 Distal leaf cells linear, the apical cells much shorter
14 Costa variable on the same plant, forked on at least some leaves .............................. Hygrohypnum (Amblystegiaceae)
14 Costa reaching mid-leaf or beyond, single
15 Branch leaves 1.2-2 mm long (or more); setae smooth ............................ Rhynchostegium aquaticum (Brachytheciaceae)
15 Branch leaves 0.5-1.2 mm long
16 Leaves dimorphic: the stem leaves mostly with acute to acuminate apices, the branches leaves with blunt apices; setae smooth................. Eurhynchistastrum pulchellum (Brachytheciaceae)
16 Leaves monomorphic: stem and branch leaves mostly with acute to acuminate apices; setae rough . Oxyrrhynchium hians (Brachytheciaceae)

13 Distal leaf cells short to linear, the apical cells about the same
17 Mid- to upper leaf cells quadrate to short-rectangular or rhomboidal, mostly 1:3:1
18 Leaf margins revolute beyond midleaf ................................LESKEACEAE
18 Leaf margins plane or merely recurved below
19 Upper leaf cells around the apex nearly quadrate, thick-walled; leaves appressed and overlapping when dry.......................... Leskeella (Leskeaceae)
19 Upper leaf cells around the apex more elongate, approaching oblong or rhomboidal; leaves spreading when dry
20 Alar cells hyaline, inflated; margins denticulate or serrulate..................... Cratoneuron (Amblystegiaceae)
20 Alar cells not or only slightly inflated, green to brownish; margins entire to finely denticulate........................................ Hygroamblystegium (Amblystegiaceae)

17 Mid- to upper leaf cells rectangular to linear, 3:10:1
21 Distal leaf cells short, mostly 3:5:1 .................. AMBLYSTEGIACEAE
21 Distal leaf cells longer, more than 6:1
22 Leaves 0.6-1.5 mm long, plane, not plicate; costa vanishing into the acumen, often bearing papillose rhizoids and/or gemmae on the back; leaf margins toothed from apex to base, the teeth often flaring to reflexed below ........................................... Conardia (Amblystegiaceae)

22 Leaves, costa, and margins not all as above
23 Stems julaceous; leaves rounded to obtuse at the apex, not plicate ..... ................................................................. Scleropodium (Brachytheciaceae)

23 Stems not julaceous, or if so, the leaves acute to acuminate at the apex, plicate or not
24 Stems with dense paraphyllia; costa strong and thick, percurrent; on rocks at high elevations ......................... Lescuraea (Leskeaceae)

24 Stems lacking paraphyllia; costa not especially thick, rarely percurrent; various habitats
25 Leaves not plicate, 2.5-6 mm long, those of the main stem and branches not different in size or shape, the margins entire; wet to aquatic habitats ............................................. Leptodictyum (Amblystegiaceae)

25 Leaves plicate or not, 1-3 mm long, those of the main stem and branches often different in size or shape, the margins entire to serrulate; various habitats ................................................................. Brachythecium Group (Brachytheciaceae)
FAMILY TREATMENTS OF MOSSES

Family AMBLYSTEGIACEAE

Plants pleurocarpous; paraphyllia and pseudoparaphyllia absent; leaves uni-costate, the margins flat; laminal cells hexagonal to linear, smooth, with straight walls.

1 Leaves falcate-secund
   2 Leaves plicate
      3 Paraphyllia present, thread-like; leaves entire distally; stem hyalodermis absent; central strand absent ................................................................. **Palustriella**
      3 Paraphyllia absent; leaves denticulate distally; stem hyalodermis present; central strand present ................................................................. **Sanionia**
   2 Leaves not plicate
      4 Costa none or short and double, or forked with one of the forks reaching to mid-leaf; plants growing firmly attached to wet rocks in or along streams in the mountains ..........
      4 Costa otherwise; habitat various
         5 Alar cells inflated and extending nearly across the leaf base
            6 Margins serrate to serrulate; leaves ovate or lanceolate, more than 3:1 .................. **Drepanoclados**
            6 Margins entire; leaves ovate to lanceolate, more than 3:1 .............. **Hygrohypnum**
         5 Alar cells not inflated
            7 Terminal cells of leaf longer than 3:1 and not much different than the lower cells; alar cells abruptly differentiated .................. go to **Warnstorfia** (Calliergonaceae)
            7 Terminal cell of leaf 1-3:1; alar cells only gradually differentiated
               8 Plants mostly growing submerged in water or on frequently submerged rocks or ground; median leaf cells mostly more than 10:1 .................. **Leptodictyum**
               8 Plants growing on mesic to very wet habitats, but seldom submerged; median leaf cells seldom more than 8:1 .................. **Hygroamblystegium**

1 Leaves straight or slightly curved, not falcate-secund
9 Leaves tiny, 0.1-0.5 mm long .................................................. **Platydicya**
9 Leaves larger
   10 Leaves widely spreading to squarrose-recurred
      11 Costa none or very short and double
         12 Plants slender with creeping stems; leaves finely serrate from base to apex; alar cells small and quadrate .................................................. **Campylophyllum**
         12 Plants more robust with erect-ascending stems; leaves entire; alar cells inflated ................................................................. **Campylidiadelphus**
      11 Costa single, well-developed, ending at or somewhat above mid-leaf
         13 Leaves crowded, often somewhat secund at the tips; upper cells oblong-linear, 6-8:1 (or more); alar cells gradually differentiated, subquadrate, firm-walled...
            13 Leaves not crowded or secund; upper cells short-rhomboidal, 4-6:1; alar cells rather abruptly differentiated, short-oblong, not noticeably firm-walled...
               10 Leaves appressed to spreading, but not widely or squarrose
                  14 Stems erect, tomentose throughout; leaves strongly multi-plicate; costa radiculose at back below ........................................... **Tomentypnum**
                  14 Stems, leaves, and costa not as above
                     15 Costa none or short and double, or forked with one of the forks reaching to mid-leaf; plants growing firmly attached to wet rocks in or along streams in the mountains ........................................... **Hygrohypnum**
                     15 Costa single and well-developed, ending at mid-leaf or beyond; habitats various
                        16 Median leaf cells rhomboidal to linear, 6-15:1
                           17 Leaves 0.6-1.5 mm long, often bearing papillose rhizoids and/or gemmae on the back; leaf margins toothed from apex to base, the teeth often flaring to reflexed below ....................... **Conardia**
                           17 Leaves 1-4 mm long, not bearing gemmae; leaf margins entire
                              .............................................................................. **Leptodictyum**
Amblystegium

Plants small in soft mats, bright green to yellowish, but not particularly glossy. Stems creeping, irregularly branched; paraphyllia absent. Leaves erect to spreading, never complanate, to about 1 mm long, ovate to lanceolate, acuminate, not plicate; margins plane, entire to serrulate; costa weak, mostly to about mid-leaf, sometimes shorter or longer; medial cells oblong to rhomboidal; alar cells quadrate to rectangular. Autoicous. Capsule strongly curved, inclined to horizontal. A single species in the genus. *Amblystegium serpens* (Hedwig) Bruch & Schimper *Amblystegium juratzkanum* Schimper

Campyliadelphus

Plants generally small, green, yellowish, to brownish. Stems irregularly branched; paraphyllia absent. Leaves straight to usually somewhat falcate, usually squarrose, not plicate, acuminate; margins plane or slightly recurved near base, entire to serrulate; costa single (ours), ending at midleaf or beyond; medial cells rectangular to linear; alar cells numerous. Dioicus. Capsule curved and horizontal. *Campyliadelphus chrysophyllus* (Bridel) Kanda

Campylium

Plants medium-sized, usually erect, green to yellowish or brownish. Stems irregularly branched; paraphyllia absent. Leaves spreading to squarrose from an erect sheathing base, cordate-ovate, acuminate at the apex, not plicate, concave; margins plane, entire; costa short, double or single; medial cells linear or nearly so; alar cells numerous, quadrate to rectangular. Dioicus or autoicous. Capsule curved, inclined to horizontal. Species formerly in *Campylium* have been segregated as follows:

1 Costa single, well-developed, ending at or somewhat above mid-leaf
   2 Leaves crowded, often somewhat secund at the tips; upper cells oblong-linear, 6-8:1 (or more); alar cells gradually differentiated, subquadrate, firm-walled.....go to *Campyliadelphus*
   2 Leaves not crowded or secund; upper cells short-rhomboidal, 4-6:1; alar cells rather abruptly differentiated, short-oblong, not noticeably firm-walled..................go to *Pseudocampylium*

1 Costa none or very short and double
   3 Plants slender with creeping stems; leaves finely serrate from base to apex; alar cells small and quadrate..................................................go to *Campyliophyllum*
   3 Plants more robust with erect-ascending stems; leaves entire; alar cells inflated..............................

..........................................................Campylium, below

*Campylium stellatum* (Hedwig) C. Jensen. Damp to wet soil and humus in shaded sites at high elevations. The leaf acumen is frequently differentiated and constituting 40-65% of the leaf length. [Taos].

Campyliophyllum

Plants small, green to yellow-green. Stems irregularly to pinnately branched; paraphyllia absent to sparse. Leaves recurved to squarrose, cordate to ovate, concave, abruptly narrowed to a channeled acumen, the apex acuminate, mostly not plicate; costa short and double; medial cells elongate hexagonal to linear, some distal cells prorate; alar cells few to numerous. Autoicous. Capsule mostly curved and horizontal.

1 Distal alar cells of stem leaves transversely rectangular, quadrate, or shortly rectangular; basal alar cells mostly shortly rectangular, sometimes rectangular, the alar group extending from the margin 50-65% of the distance to the leaf middle at insertion; seta 9-17 mm........*C. hispidulum*
I Distal alar cells of stem leaves quadrate to rectangular; basal alar cells elongate-rectangular to shortly rectangular, the alar group extending from the margin 40-50% of the distance to the leaf middle at insertion; seta 12-22 mm long .................................................. C. sommerfeltii

**Campylophyllum hispidulum** (Brid.) Hedenäs [Campylium hispidulum (Bridel) Mitten]. On damp to wet soil, rocks, and rotten wood in cool, shaded places.

[Donu, SanM, Unio].

**Campylophyllum sommerfeltii** (Myrin) Hedenäs [Campylium hispidulum var. sommerfeltii (Myrin) Lindberg; C. sommerfeltii (Myrin) Lange]. Though not officially reported for New Mexico, *Campylophyllum sommerfeltii* is easily confused with *C. hispidulum*, and is included here for comparison.

**Conardia**

Plants small, light green to yellowish. Stems irregularly branched in generally one plane; paraphyllia absent; rhizoids warty-papillose, on stems and dorsal leaf surface and costa. Leaves erect to spreading, mostly straight, lanceolate to ovate-lanceolate, 0.6-1.2 mm long, the apex acuminate, not plicate; margins generally plane, denticulate; costa single, ending in acumen; medial cells linear; alar cells numerous, quadrate to rectangular, not inflated. Autoicous (North America). Capsule slightly curved, inclined.

**Conardia compacta** (Müller Hal.) Robinson [Rhynchostegiella compacta (Müller Hal.) Leoske]. Damp cliffs, logs, stumps, humus, and moist bark. Distinguished by the warty-papillose rhizoids or gemmae on the back of the costa or near the leaf apex.

[Bern, Ctr, Dona, Eddy, Gran, Oter, Soco, Torr].

**Cratoneuron**

Plants medium-sized to rather large, somewhat aquatic, green to yellowish, prostrate in thick mats or erect in deep tufts. Stems irregularly branched to regularly pinnate; paraphyllia abundant to nearly lacking in *C. filicinum*. Leaves triangular to ovate-lanceolate, straight to strongly falcate, often plicate, the apex acuminate; margins entire to serrulate; costa stout from midleaf to percurrent; medial cells oblong to linear; alar cells inflated and often forming auricles. Dioicous. Capsules curved, inclined to drooping.

**Cratoneuron filicinum** (Hedwig) Spruce. Damp to wet rocks, soil, and logs, submerged in springs and ponds.

[Bern, Ctr, Cofl, Gran, Linc, Oter, SanM, Sand, Sant, Soco, Taos].

**Drepanoclados**

Plants medium-sized to rather large, somewhat aquatic, green to yellowish, to brownish. Stems irregularly to pinnately branched; paraphyllia absent. Leaves erect to spreading, straight to falcate (ours), cordate to ovate, concave, acuminate, not plicate; margins plane, usually entire; costa double and short or single and long (ours); medial cells linear; alar cells numerous. Autoicous, synoicous, or dioicous (ours). Capsules curved and horizontal.

**Drepanoclados aduncus** (Hedwig) Warnstorf [Drepanocladus aduncus (Hedwig) Warnstorf var. kneifi (Schimper) Moenkemeyer, Drepanocladus aduncus (Hedwig) Warnstorf var. polycarpus (Blandow ex Voi) Roth]. Wet meadows, swamps, boggy ground, seepage areas, stream banks, wet ground.

[Ctr, Cofl, Gran, McKi, Mora, Oter, Sand, SanM, Rio,A, Unio].

**Hygroamblystegium**

Plants slender to robust, yellow-green to olive-green. Stems irregularly branched; paraphyllia often present; stem and branch leaves sometimes dissimilar. Leaves erect, not or only slightly falcate, lanceolate to ovate or oblong, the apex acuminate to acute, not plicate; margins plane, entire to denticulate; costa single, broad, often curved slightly distally; medial cells smooth, short rectangular; alar cells weakly developed. Autoicous. Capsules curved, inclined. The single species is highly variable, and includes numerous forms that have been named as separate species, but little of the variation is correlated in any meaningful sense.

**Hygroamblystegium varium** (Hedwig) Mönkemeyer [Amblystegium humile (Beauvois) Bruch, Schimper, & Gumbel, Amblystegium fluviatile (Hedwig) Bruch, Schimper, & Gumbel, Amblystegium varium (Hedwig) Lindberg, Hygroamblystegium noterophilum (Sullivan & Lesquereux) Holzinger, Hygroamblystegium orthoclodon (P. Beauvois) Macoun & Kindberg, Hygroamblystegium tenax (Hedwig) Jennings, Leptodictyum humile (P. Beauvois) Ochyra, Leptodictyum trichopodium (Schulz) Warnstorf]. In and around streams, ditches, springs, and ponds, bases of trees, rotten wood, rocks.

[Bern, Ctr, Dona, Gran, Linc, Oter, SanM, Sant, Sier, Soco, Taos, Torr].

Two weak varieties may be sought, but these seem to be insignificant:

- a Costa percurrent; alar cells somewhat differentiated; plants never complanate...var. *varium*
- a Costa ending before the apex; alar cells undifferentiated; plants sometimes complanate...var. *humile* (P. Beauvois) ??

**Hygrohypnum**

Plants small to robust, yellow-green to olive-green. Stems irregularly branched; paraphyllia absent (?). Leaves ovate or orbicular, straight to strongly falcate, not plicate, the apex rounded to obtuse occasionally with an apiculus; margins plane, entire to weakly denticulate; usually short and double and ending before mid-leaf to long a single and extending beyond mid-leaf; medial cells linear; alar cells not or differentiated. Autoicous or dioicous. Capsules erect, curved.
1 Alar cells large, thin-walled, clear, often forming auricles; cells of the stem epidermis abruptly enlarged, thin-walled and hyaline…………………………………………………………… H. ochraceum
1 Alar cells mostly only moderately enlarged, rarely inflated, ± chlorophyllose; cells of the stem epidermis not enlarged, small and thick-walled

2 Leaves ovate-lanceolate, oblong, or oblong-lanceolate, the apex acute……………… H. luridum
2 Leaves broadly ovate to nearly orbicular, the apex mostly obtuse…………………H. molle

Hygrohypnum luridum (Hedwig) Jennings [Hygrohypnum luridum (Hedwig) Jennings var. julaceum (Schimper) Podpera]. In and around mountain streams, waterfalls, and dripping cliffs, submerged or on wet rocks, soil, or rotten logs.
[Bern, Dona, Linc, Oter, Mora, RioA, SanM, Sant, Taos].

Hygrohypnum molle (Hedwig) Loeske. Mostly on wet rocks of mountain streams.
[Linc, Sant].

Hygrohypnum ochraceum (Turner ex Wilson) Loeske. In and around mountain streams, springs, seeps, and waterfalls.
[Linc, Mora, Sand, SanM].

Leptodictyum
Plants green, yellowish to brownish in loose to dense mats. Stems irregularly branched. Leaves erect to spreading, oblong-lanceolate, not plicate, the apex acute to acuminate; margins plane, entire to serrulate; costa single, ending above mid-leaf; medial cells smooth, linear; alar cells enlarged, thin-walled, rectangular. Dioicus. Capsules tipped or horizontal, curved.

Leptodictyum riparium (Hedwig) Warnstorf [Amblystegium riparium (Hedwig) Schimper]. On wet ground of stream banks, lake shores, ditches, and wet meadows, on rocks in streams.
[Catr, Dona, Gran, Luna, Mora, Sand, SanM, Sant, Sier, Taos].

Palustriella
Plants medium-sized to robust, often stiff, yellow-green to brownish yellow. Stems irregularly to pinnately branched; paraphyllia present. Leaves straight to strongly falcate, ovate, plicate, the apex gradually narrowed to a long acumen; margins plane or reflexed basally, denticulate distally; costa strong, ending in the acumen; medial cells linear; alar cells numerous, rectangular, mostly thin-walled and inflated, reaching nearly to margin. Dioicus. Capsules horizontal, curved.

Palustriella falcata (Bridel) Hedenäes [Cratoneuron commutatum of North American reports, Cratoneuron decipiens of North American reports, Palustriella commutata of North American reports]. Calcium-rich wet soil and rocks, often submerged in springs and streams.
[Oter, Mora, Taos].

Platydictya
Plants tiny, delicate, in wispy mats. Stems creeping, irregularly branched; paraphyllia absent. Leaves erect to spreading, lanceolate, not plicate, the apex acute to acuminate; margins plane, entire to denticulate; costa short or none; medial cells subquadrate to rhomboidal, smooth; alar cells weakly differentiated. Dioicus or dioicus. Capsules erect to inclined.

Platydictya jungermannioides (Bridel) Crum. On rocks and soil in crevices and ledges, hollows of roots, shady places.
[Bern, Gran, Soco, Taos].

Pseudocampylium
Plants slender, light green to yellowish. Stems creeping, irregularly branched; rhizoids smooth; paraphyllia sparse. Leaves widely spreading to commonly squarrose-recurved wet or dry, cordate-ovate, the apex long-acuminate; margin plane, entire to nearly so, decurrent; costa single, to mid-leaf or beyond; medial cells linear to rectangular; alar cells few, somewhat inflated. Dioicus. Capsules horizontal, curved.

Pseudocampylium radicale (P. Beauvois) Vanderpoorten & Hedenäes [Campylium radicale (P. Beauvois) Grout]. Wet meadows and swamps, often under grasses and sedges.
[Taos].

Sanioniia
Plants medium-sized to large, greenish or yellowish green. Stems often pinnately branched; paraphyllia absent; rhizoids smooth. Leaves strongly falcate (ours) to almost straight, triangular to ovate, plicate, the apex long-acuminate; margins plane or recurved, denticulate; costa single, ending in the acumen; medial cells linear, smooth, or sometimes prorate; alar cells few to numerous, thin-walled and inflated, or not or hardly decurrent. Dioicus. Capsules erect and straight to horizontal and curved.

Sanioniia uncinata (Hedwig) Loeske [Drepanocladius uncinatus (Hedwig) Warnstorf]. Wet to dry soil, rocks, and bases of trees, usually near streams or boggy ground but often on slightly drier soil.
[Catr, Colf, Line, Oter, Sand, SanM, Sant, Soco, Taos].

Straminergon: go to Calliergonaceae
Tomentypnum

Plants robust, erect, forming tufts or hummocks, golden-green. Stems erect, pinnately branched in one plane, the branches horizontal; rhizoids smooth; paraphyllia absent. Leaves crowded, erect, mostly straight or somewhat falcate, long lanceolate, strongly plicate, the apex slenderly acuminate; margins plane to recurved, entire to sinuose; costa single, ending near the leaf apex; medial cells long-linear, thick-walled, nodose; alar cells scarcely differentiated. Dioicous. Capsules inclined to horizontal, curved. The name was spelled originally as above by Loeske; Tomentypnum is a commonly encountered variant spelling.

Tomentypnum nitens (Hedwig) Loeske. On swampy and boggy ground.

Warnstorfa: go to Calliergonaceae

Amblystegium serpens

Campyliadelphus chrysophyllus

Camplylium stellatum
Conardia compacta

Cratoneuron filicinum

Drepanoclados aduncus

Hygroamblystegium varium
Hygrohypnum ochraceum

Leptodictyum riparium
leaf

*Palustriella falcata*

paraphyllia

*Platydictya jungermannioides*

*Sanionia uncinata*
Family ANDREAEACEAE
Plants acrocarpous, on acidic rocks; leaves uni- or ecostate; laminal cells papillose to smooth, with thick sinuous walls; calyptrae small; seta absent (pseudopodium present); capsules with four valves attached at apex.

**Andreaea**
Plants dark green to black, in a dense clump or turf. Stems erect, irregularly branched. Leaves erect, spiralling around the stem, lanceolate, not plicate; margins plane; costa very short to absent; medial cells quadrate, pitted, the longitudinal walls sinuose; alar cells not differentiated. Autoicous. Capsules erect, opening by four longitudinal valves attached at the apex.

*Andreaea rupestris* Hedwig Small to rather large, flattish, brown to blackish tufts on acidic rocks.

![Image](image1.png)

Family ANOMODONTACEAE
Plants pleurocarpous; leaves heteromorphic, those of main stem conspicuously different than those of branches, uni-costate; laminal cells quadrate to elongate, 1- to multi-papillose, the walls thick and straight.

**Anomodon**
Plants slender to robust, in greenish to reddish brown mats. Stems arcuate, paraphyllia absent. Stem leaves minute and scale-like. Branch leaves larger, ovate to lanceolate or spatulate, not plicate; margins plane, entire; costa single, strong, ending near the apex; medial cells hexagonal to oblong, papillate. Dioicous. Capsules erect, symmetric.

1 Leaves with hyaline hair-points; margins revolute .............................................. *A. rostratus*
1 Leaves without hair-points; margins plane
   2 Leaves acute to apiculate; secondary branchlets noticeably attenuate ................. *A. attenuatus*
   2 Leaves obtuse, rounded; secondary branchlets not or only slightly attenuate .......... *A. minor*

*Anomodon attenuatus* (Hedwig) Hübener On rock, soil, and bark at the bases of trees.
[Dona, Gran, Linc, SanM, Sant, Sier, Taos].
**Anomodon minor** (Hedwig) Führer
On rocks and bark at the bases of trees.
[Gran, Linc, SanM, Sant].

**Anomodon rostratus** (Hedwig) Schimper
On bark or the bases of trees, also soil.
[Dona, Linc, SanM, Torr].

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**Family AULACOMNIACEAE**

Plants acrocarpous, the stems tomentose below, gemmiferous; leaves uni-costate, the margins revolute or recurved; laminal cells quadrate to elongate, 1-papillose.

**Aulacomnium**

1 Gemmae relatively few and borne in loose clusters at the end of a somewhat leafy stalk; basal cells of leaves inflated and often colored ................................................. **A. palustre**
1 Gemmae numerous and borne in tight globose heads at the end of a naked stalk; basal cells of leaves not at all inflated and not colored ................................................. **A. androgynum**

*Aulacomnium androgynum* (Hedwig) Schwägrichen. On rotten logs and stumps; not yet known from New Mexico.

*Aulacomnium palustre* (Hedwig) Schwägrichen [Aulacomnium palustre (Hedwig) Schwägrichen var. *imbricatum* Bruch & Schimper]. On saturated soil in swampy ground and fens.
Family BARTRAMIACEAE

Plants mostly acrocarpous, the stems erect and tomentose below; leaves uni-costate, mostly acuminate; laminal cells quadrate to linear, often prorate, the wall straight.

1 Leaves with a ± clasping or sheathing base, the basal portion differentiated and greatly enlarged, the blade subulate ................................................................. Bartramia

1 Leaves not clasping or sheathing, the base usually ovate, the blade subulate or broader
   2 Blades lanceolate to ovate; branches frequently in whorls at the upper part of the stems; plants of wet places ................................................................. Philonotis
   2 Blades subulate or linear; plants of various habitats .................................................. Anacolia

Anacolia

1 Distal leaf cells papillose at the ends on both surfaces; inner basal cells linear; blade 2- to 3-stratose distally ................................................................. A. laevisphaera

1 Distal leaf cells smooth or only a few with low papillae at the ends on the abaxial surface; inner basal cells quadrate or short-rectangular; blade 1- to 2-stratose distally .................. A. menziesii

Anacolia laevisphaera (Taylor) Flowers [Anacolia subsessilis (Taylor) Brotherus]. Dry soil in rock crevices, talus.

Anacolia menziesii (Turner) Paris. On rocks and ledges, often covered by thin soil.

Bartramia

1 Leaf tips fragile and usually broken ........................................................................ B. potosica

1 Leaf tips not fragile, intact
   2 Margins plane; costa filling the acumen; capsule about 1 mm long ....................... B. ithyphylla
   2 Margins strongly revolute; costa not filling the acumen; capsule 1.5-2 mm long ... B. brevifolia

Bartramia brevifolia Bridel. Rock crevices and ledges.

Bartramia ithyphylla Bridel. On soil or rock.

Bartramia potosica Montagne. Rock crevices and ledges.

Philonotis

1 Leaf cells prorate at their proximal ends; distal cells linear-oblong, 5-8:1 ................... P. fontana

1 Leaf cells prorate at their distal ends; distal cells oblong to rectangular, 2-5:1
2 Distal cells rectangular, 4-5:1, arranged in obvious longitudinal rows.................. *P. marchica*

2 Distal cells short-oblong, 2-3:1, somewhat irregularly arranged, the rows less obvious..................

................................................................................................................................................. *P. capillaris*

*Philonotis capillaris* Lindberg  Moist sandy soil or humus.

*Philonotis fontana* (Hedwig) Bridel  Wet places on rock and soil, often in or at the edge of streams and creeks.

*Philonotis marchica* (Hedwig) Bridel  Rocks and soil in wet places.
Philonotis marchica

Family BRACHYTHECIACEAE

Plants pleurocarpous; paraphyllia usually absent; leaves mostly uni-costate; laminal cells rhomboidal to linear, smooth.

1 Apical leaf cells conspicuously shorter than the linear distal or medial cells
  2 Branches noticeably julaceous, especially when dry; leaves entire to slightly serrulate

.................................................................Scleropodium

  2 Branches not noticeably julaceous; leaves often strongly serrate
  3 Branch leaves 1.2-2 mm long (or more); setae smooth (R. aquaticum)....Rhynchostegium
  3 Branch leaves 0.5-1.2 mm long; setae smooth or rough
  4 Leaves dimorphic: the stem leaves mostly with acute to acuminate apices, the branches leaves with blunt apices; setae smooth

.........................................................Eurhynchiastrum

  4 Leaves monomorphic: stem and branch leaves mostly with acute to acuminate apices; setae rough

...............................................................Oxyrrhynchium

1 Apical and distal/medial cells about the same length

5 Stems stiffly erect, densely brown tomentose throughout; leaves appressed, linear-lanceolate, multi-plicate; costa slender and difficult to distinguish from the plicae

..............................................................................................................................................Tomentypnum (Amblystegiaceae)

5 Plants not as above

6 Plants small and slender; costa vanishing into the acumen, often bearing gemmae on the back toward the apex; leaves 0.6-1.2 mm long....go to Conardia (Amblystegiaceae)

6 Plants mostly medium-sized (small in some Brachythecium); costa usually ending at ⅔ the leaf length or less (extending into the acumen in Brachythecium populeum), lacking gemmae; leaves of various lengths

  7 Alar cells scarcely differentiated and leaf margins strongly toothed from apex to base and shoots appearing flattened (R. serraratum)....Rhynchostegium

7 Alar cells, leaf margins, and shoots not all as above Brachythecium group

Brachythecium group (including Brachytheciastrum, Brachythecium, and Sciuro-hypnum)

1 Costa disappearing into the acumen to percurrent or nearly so, 80-100% of leaf length

..............................................................................................................................................Sciuro-hypnum populeum

1 Cost ending well below the apex, 20-80% of leaf length

2 Alar cells thin-walled and inflated or noticeably enlarged

  3 Alar regions large, sac-like, the enlarged cells reaching the leaf margins; plants at least somewhat dendroid in habit Brachythecium rivulare

  3 Alar regions not large, not sac-like, the enlarged cells not reaching the margin; plants not dendroid in habit Brachythecium frigidum

2 Alar cells thick-walled, not inflated, or not well-differentiated

4 Alar region not clearly differentiated; basal laminal cells in 3-8 rows, markedly different from the more distal cells

  5 Stem leaves deeply plicate; basal laminal cells 6-11 μm wide, in 3 rows, the region opaque Brachythecium laetum

  5 Stems leaves not or moderately plicate; basal laminal cells 11-19 μm wide, in 3-8 rows, the region pullucid

  6 Basal laminal cells in 5-8 rows; stem leaves 2-3 mm long Brachythecium roteanum

  6 Basal laminal cells in 3-4 rows; stem leaves 1-1.6 mm long Brachythecium acuminatum
4 Alar region ± clearly differentiated; basal laminal cells in 1-3 rows and not markedly different from the more distal cells
6 Plants slender; branch leaves less than 1 mm long
7 Shoots somewhat julaceous, often yellowish (but also green), the leaves generally appressed
8 Capsules inclined to horizontal; leaves usually concave (causing folds or splits when flattened), tending toward ovate.........................Brachytheciastrum collinum
8 Capsules straight and erect; leaves usually usually flat, tending toward lanceolate ..
.................................................................Brachytheciastrum fendleri
7 Shoots not at all julaceous, usually green, the leaves spreading
9 Stem leaves falcate-secund to circinate when dry, especially at the stem tips, not concave, long-tapering to a slender point............Brachytheciastrum velutinum
9 Stem leaves straight, not falcate-secund or only slightly so, rounded and concave, abruptly narrowed to the apex.........................Sciuro-hypnum plumosum
6 Plants thicker, often robust; branch leaves more than 1 mm long
10 Leaves noticeably falcate-secund .....................Brachythecium erythrorrhizum
10 Leaves mostly straight
11 Leaves highly concave, orbicular-ovate, abruptly narrowed to the subula, the leaf tips inconspicuous ......................................Brachythecium ruderale
11 Leaves not markedly concave, lanceolate to ovate, gradually tapered to the apex, the leaf apices often conspicuous and awn-like (though delicate)
12 Alar regions pellucid-translucent, the cell walls thin.................................Sciuro-hypnum latifolium
12 Alar regions opaque, the cell walls thick
13 Leaves entire or nearly so; leaf margins usually revolute; shoots julusaceous ...........................................Brachythecium alpinum
13 Leaves noticeably serrulate to serrate; leaf margins usually plane, or recurved basally; shoots julaceous or not
14 Costa lacking a terminal abaxial spine; leaf bases conspicuously long-decurrent.................................Sciuro-hypnum oedipodium
14 Costa with a terminal abaxial spine; leaf bases not or only short-decurrent.........................................Brachythecium salebrosum

Brachytheciastrum collinum (Schleicher ex Müller Hal.) Ignatov & Huttunen [Brachythecium collinum (Schleicher ex Müller Hal.) Schimper]. On soil, soil over rock, and in crevices.

Brachytheciastrum fendleri (Sullivant) Ochyra & Żarnowiec [Brachythecium fendleri (Sullivant) Jaeger]. On soil and soil over rock.

Brachythecium velutinum (Hedwig) Ignatov & Huttunen [Brachythecium suberythrorrhizum Renauld & Cardot, Brachythecium petrophilum R.S. Williams, Brachythecium velutinum (Hedwig) Bruch & Schimper, Brachythecium velutinum (Hedwig) Bruch & Schimper var. venustum (De Notaris) Arcangeli]. On soil, soil over rocks, or rotten wood in the mountains.

Brachythecium acuminatum (Hedwig) Austin On bark and rotten logs, sometimes soil or rock, in the mountains.

Brachythecium alpinum (Hedwig) Schimper On rock, sandy soil, and grassy places, often in areas dry during part of the year.

Brachythecium erythrorrhizum Schimper On soil or soil over rock.

Brachythecium frigidum (Müller Hal.) Bescherele Though not officially reported from New Mexico, we suspect that many of our plants identified as Sciuro-hypnum latifolium are, in fact, Brachythecium frigidum.

Brachythecium laetum (Bridel) Schimper in B.S.G. [Brachythecium oxycladon (Bridel) Jaeger]. On rotting wood, tree trunks, or the forest floor, often among grasses, sometimes on soil over rock.

Brachythecium rivulare Bruch & Schimper On wet ground or stones and boulders in or near streams.

Brachythecium rotaeum De Notaris On moist soil and rocks in the northern mountains.

Brachythecium ruderale (Bridel) W.R. Buck [Brachythecium stereopona (Spruce ex Mitten) Jaeger, Brachythecium wootonii Grout]. On moist shaded soil in the mountains.

Brachythecium salebrosum (Weber & Mohr) Bruch & Schimper On rotting wood, tree trunks, or the forest floor, often among grasses, sometimes on soil over rock.
**Sciurohypnum latifolium** (Kindberg) Ignatov & Huttunen [Brachythecium latifolium Kindberg, Brachythecium nelsonii Grout]. In wet places in the high mountains.

**Sciurohypnum oedipodium** (Mitten) Ignatov & Huttunen [Brachythecium oedipodium (Mitten) Jaeger, Brachythecium starkei of many North American works]. On soil, logs, roots, and litter in the mountains.

**Sciurohypnum plumosum** (Hedwig) Ignatov & Huttunen [Brachythecium plumosum (Hedwig) Bruch & Schimper]. On stones, soil, and tree roots, usually in moist forests.

**Sciurohypnum populeum** (Hedwig) Ignatov & Huttunen [Brachythecium populeum (Hedwig) Bruch & Schimper]. On soil, logs, and tree roots, usually in moist forests.

**Sciurohypnum obtusifolium** (Mitten) Kindberg. Rock and soil in wet places, usually at least temporarily submerged, creek bottoms; known from pre-1980 collections in Grant, Otero, and San Miguel counties.

**Eurhynchiastrum**

**Eurhynchiastrum pulchellum** (Hedwig) Ignatov & Huttunen [Eurhynchium diversifolium Schimper, Eurhynchium pulchellum (Hedwig) Jennings, Rhynchostegium pulchellum (Hedwig) Robinson]. On soil, soil over rock, rotten logs, and tree roots, usually in moist forests.

**Eurhynchium** Our species have been relegated to other genera, as follows:

1 Branch leaves 1.2-2 mm long (or more); setae smooth...................... **Rhynchostegium riparioides**
1 Branch leaves 0.5-1.2 mm long
2 Leaves dimorphic: the stem leaves mostly with acute to acuminate apices, the branches leaves with blunt apices; setae smooth.......................... **Eurhynchiastrum pulchellum** (Brachytheciaceae)
2 Leaves monomorphic: stem and branch leaves mostly with acute to acuminate apices; setae rough .................................................. **Oxyrrhynchium hians** (Brachytheciaceae)

**Oxyrrhynchium**

**Oxyrrhynchium hians** (Hedwig) Loeske [Eurhynchium hians (Hedwig) Sande-Lacouture]. On moist, sometimes seepy, soil in the mountains.

**Platyhypnidium**: go to **Rhynchostegium aquaticum**

**Rhynchostegium**

1 Leaves broadly acute to rounded at the apex, not twisted at the tip; apical cells very much shorter than the distal or medial cells; plants on wet rocks (or seasonally so) of brooks or springs ...........

...................................................................................................................................................... **R. aquaticum**

1 Leaves acuminate at the apex, the slender acumen usually twisted at the tip; apical cells hardly if at all shorter than the distal or medial cells; plants on soil, wood & bark, and rock in relatively dry habitats.......................................................... **R. serrulatum**

**Rhynchostegium aquaticum** A. Jaeger [Platyhypnidium aquaticum (A. Jaeger) M. Fleischer, Rhynchostegium riparioides of American authors]. Aquatic, attached to stones in or at stream side.

**Rhynchostegium serrulatum** (Hedwig) Jaeger & Sauerbeck [Steerecleus serrulatus (Hedwig) Robinson]. On soil, humus, rotten wood, bark, and sometimes rock.

**Scleropodium**

**Scleropodium obtusifolium** (Mitten) Kindberg. Rock and soil in wet places, usually at least temporarily submerged, creek bottoms; known from pre-1980 collections in Grant, Otero, and San Miguel counties.
Family BRYACEAE

Plants acrocarpous, the primary stems usually erect and not tomentose; leaves uni-costate, the margins conspicuously bordered or not; laminal cells rhomboidal (usually) to linear, smooth.

+ Anomobryum julaceum

1 Leaves large, 4-10 mm long, clustered in somewhat terminal rosettes of 18-55 leaves, this atop an erect secondary stem that arises from a horizontal (stoloniferous/rhizomatous) primary stem; leaf margins strongly revolute to mid-leaf or beyond, and serrate from mid-leaf to apex .............

.......................................................... Rhodobryum

1 Leaves, stems, and margins not all as above
2 Distal leaf cells mostly linear; leaves lacking a limbidium
3 Leaves linear-subulate or setaceous from a broader, ± oblong or ovate base; costa wide, occupying almost the entire distal portion of the leaf ........ go to Leptobryum (Meesiaceae)
3 Leaves mostly ovate to lanceolate (the extreme distal ones sometimes linear); costa slender ................................................................. go to Pohlia (Mielichofferiaceae)
2 Distal portions of the leaf with chlorophyll
4 Costa percurrent to exserted, but not as a long, spinose, hyaline awn; capsules inclined to
pendant; plants common, on various habitats, including down or rotting wood, but only a
few species commonly found on living trees................................. Bryum group
4 Costa exerted into a long, spinose, hyaline awn (reddish at the base); capsules erect (but
unknown in our plants); plants uncommon, on tree trunks....................Leptostomopsis
Bryum group (including Bryum, Gemmabryum, Imbribryum, Plagiobryoides, Ptychostomum,
and Rosulabryum): 
1 Distal portions of the leaf white, lacking chlorophyll, giving the plant a silvery appearance
2 Costa excurrent; stems not brittle as above ................................. Bryum lanatum
2 Costa not reaching the apex; stems not brittle as above ..................... Bryum argenteum
1 Distal portions of the leaf with chlorophyll, the same color as the mid-leaf portion, the plants not
silvery
3 Limbidium absent
4 Leafy stems julaceous, with closely overlapping concave leaves; plants commonly dark red
to reddish green, sometimes purple-black, in dense cushions .......... Imbribryum miniatum
4 Leafy stems not julaceous as above; plants various shades of red to green
5 Filiform gemmae present in the distal leaf axes
6 Innovations rosulate; leaves obovate, flat; filiform gemmae brown when mature
..........................................................Rosulabryum laevifilum
6 Innovations evenly foliate; leaves ovate to obovate, weakly concave; filiform
gemmae brown to reddish brown.................................Rosulabryum flaccidum
5 Filiform gemmae absent, but bulbils may be present
7 Plants small, the stems mostly less than 1 cm long
8 Bulbilis absent; leaf margins plane; costa variable, percurrent to long-excurrent as
an awn..................................................................Gemmabryum kunzeii
8 Bulbilis present, usually 1-2 in the upper leaf axes, becoming visible by their
growth that causes the leaves to spread; leaf margins revolute proximally; costa
mostly percurrent, never extended to an awn ..........Gemmabryum dichotomum
7 Plants larger, the stems mostly more than 1 cm long
9 Plants and leaves red or red-green, red tints usually present; margins recurved
proximally; costa reddish; proximal leaf cells quadrate....................Imbribryum
muehlenbeckii
9 Plants and leaves bright green to yellow-green, lacking red tints, becoming straw-
colored with age; margins plane throughout; costa brown to yellow-brown;
proximal leaf cells short-rectangular ..................Imbribryum gemmiparum
3 Limbidium definitely present (weak in some Rosulabryum with filiform gemmae)
10 Leaf apices obtuse or rounded; leaves broadly ovate to orbicular; costa percurrent
11 Leaf margins recurved at least below; leaves reddish proximally, noticeably
decurrent; axillary gemmae, when present, globose; plants commonly reddish or
red-brown (also green)..................................................Plagiobryoides incrassatolimbata
11 Leaf margins plane, not recurved; leaves green proximally, scarcely decurrent;
axillary gemmae, when present, filiform; plants green to yellow-green .................
..........................................................Ptychostomum cyclophyllum
10 Leaf apices definitely pointed, acute to long-acuminate or nearly awned; leaves lanceolate
to elliptic; costa percurrent to excurrent
12 Leaves spirally twisted around the stem when dry (sometimes each individual leaf is
spirally twisted, and not so much twisted together around the stem)
13 Filiform gemmae present in distal leaf axes
14 Leaves usually longer than 3 mm; margins strongly serratate distally; limbidium
strong .......................................................Rosulabryum andicola
14 Leaves usually less than 2 mm long; margins entire to serrulate distally;
limbidium weak or absent
15 Innovations rosulate; leaves obovate, flat; filiform gemmae brown when
mature ................................Rosulabryum laevifilum
15 Innovations evenly foliate; leaves ovate to obovate, weakly concave; filiform gemmae brown to reddish brown .......... Rosulabryum flaccidum

13 Filiform gemmae absent
16 Distal cells porose; leaves with axillary filiform gemmae; costa short-excurrent ......................... Rosulabryum andicola
16 Distal cells not porose; leaves lacking axillary filiform gemmae; costa long-excurrent ......................... Rosulabryum capillare

12 Leaves straight or contorted when dry, but not spirally twisted around the stem
17 Basal leaf cells quadrate or nearly so across the width of the leaves, obviously set off from the longer cells upwards; plants small, mostly less than 1 cm high, with leaves closely imbricated and straight, not contorted when dry ......................... Gemmabryum valparaisense

17 Basal leaf cells ± rectangular, gradually transitioning to the cells upwards, not obviously set off; plants of various heights, but commonly taller; leaves commonly contorted when dry
18 Leaf margins plane throughout; limbidium weak, of 1-2 rows
19 Leaves obovate, widest above the middle; plants with filiform gemmae in the upper leaf axils; plants growing on bark and rotten wood, rarely rock or soil ........................................ Rosulabryum laevifilum
(Syed) Ochyra [Bryum laevifilum Syed].
19 Leaves ovate to ovate-lanceolate, widest below the middle; plants lacking gemmae; plants growing on wet soil and rock. Ptychostomum turbinatum
18 Leaf margins recurved to revolute to near the apex or at least in the lower ½ to ½; limbidium weak to strong
20 Leaves strongly decurrent, especially on sterile stems, nearly reaching to the base of the next lowest leaf ............... Ptychostomum pseudotriquetrum
20 Leaves not or only slightly decurrent
21 Leaf margins revolute to near the apex ............... Ptychostomum pallens (Bridel) J.R. Spence [Bryum pallens (Bridel) Swartz].
21 Leaf margins revolute in proximal half only [go to lead 22, far left]

22 Margins bi-stratose (in thickness), at least in the proximal 1/3
23 Plant tufts green or yellow-green; distal and median cells 3-4:1; Capsule curved-gibbous, asymmetric ........................................................... Ptychostomum cernuum
23 Plant tufts pale pink or reddish, rarely greenish; distal and median cells mostly 2-3:1; capsule not curved-gibbous (sometimes slightly curved), symmetric........................................................... Ptychostomum pallens

22 Margins uni-stratose throughout
24 Leaves obovate, widest above the middle; plants with filiform gemmae in the upper leaf axils; leaves in rosulate tufts; limbidium weak, of 1-2 rows; plants growing on bark and rotten wood, rarely rock or soil ........................................ Rosulabryum laevifilum
24 Leaves elliptic, ovate, to lanceolate, widest at or below the middle; plants lacking gemmae in leaf axils; leaves generally not in rosulate tufts; limbidium various; habit various
25 Plants quite low, mostly about 5 mm high, and nearly always less than 10 mm high
26 Distal cells longer, 3-5:1 ........................................ Gemmabryum caespiticium
26 Distal cells shorter, 2-3:1 ........................................ Ptychostomum pendulum
25 Plants taller, mostly 10-20 mm or more high
27 Distal leaf cells 3-5 times longer than wide; limbidium 1-2 cells wide near the apex ....................................................... Gemmabryum caespiticium
27 Distal leaf cells shorter, seldom more than 3 times longer than wide; limbidium often wider than above
28 Stems elongate, branched (the branches ascending), forming deep sods bound together by the rhizoids; leaves of the current season turquoise green, the arista weak and not darkened ........................................ Ptychostomum pallescens
28 Stems short, unbranched, not forming sods; leaves of the current season darker green than above, often brownish, the arista strong, brown
29 Limbidium narrow, yellowish, 2-3 cells wide; plants synoicous ........................................ Ptychostomum creberrimum
29 Limbidium wide, the same color as the lamina, mostly 3-4 cells wide; plants polyoicous ........................... Ptychostomum lonchocaule

_Bryum argenteum_ Hedwig On dry to moist soil, rocks, walls, disturbed ground, sidewalks, and cracks in roadways.

_Bryum lanatum_ P. Beauvois Moist soil and rocks, generally not in human habitats as _B. argenteum_.

_Gemmabryum caespiticium_ (Hedwig) J.R. Spence [ _Bryum caespiticium_ Hedwig ]. On damp to wet soil, sometimes also on dry ground.

_Gemmabryum dichotomum_ (Hedwig) Spence & Ramsay [ _Bryum bicolor_ Dickson, _Bryum dichotomum_ Hedwig ]. On damp or moist soil.


_Imbribryum gemmiparum_ (De Notaris) J.R. Spence [ _Bryum gemmiparum_ De Notaris ]. On wet calcareous soil and rocks. Axillary bulbils often present.

_Imbribryum miniatum_ (Lesquereux) J.R. Spence [ _Bryum miniatum_ Lesquereux ]. On wet soil and rocks of mountain streams and creeks, often in exposed sites. The margins are mostly plane throughout; bulbils and gemmae absent.


_Plagiobryoides incrassatolimbata_ (Cardot) J.R. Spence [ _Bryum incrassatolimbata_ Cardot ]. On wet rocks and soil.

_Ptychostomum cernuum_ Hornschuch [ _Bryum uliginosum_ (Bridel) Bruch & Schimper ]. On damp to wet soil.


_Ptychostomum cyclophyllum_ (Schwägrichen) J.R. Spence [ _Bryum cyclophyllum_ (Schwägrichen) Bruch & Schimper, _Bryum tortifolium_ Bridel ]. On damp or wet soil or humus.


_Ptychostomum pallens_ (Bridel) J.R. Spence [ _Bryum pallens_ (Bridel) Swartz ]. On damp or wet soil.

_Ptychostomum pallescens_ (Schleicher ex Schwägrichen) J.R. Spence [ _Bryum pallescens_ Schleicher ex Schwägrichen ]. On wet soil, sometimes rocks, at lower elevations.

_Ptychostomum pendulum_ Hornschuch [ _Bryum pendulum_ (Hornschuch) Schimper, _Bryum algovicum_ Sendtner ex Müller Hal. ]. On wet soil and rocks.

_Ptychostomum pseudotriquetrum_ (Hedwig) J.R. Spence [ _Bryum pseudotriquetrum_ (Hedwig) Gaertner et al. ]. On damp or wet soil, rock, or rotten wood.

_Ptychostomum turbinatum_ (Hedwig) J.R. Spence [ _Bryum turbinatum_ (Hedwig) Turner ]. On wet soil and rocks, streambanks, seeps, dripping cliffs, often in the water.

_Rosulabryum andicola_ (Hooker) Ochyra [ _Bryum billarderi_ Schwägrichen ]. Moist to dry soil and rock in the southern mountains.

_Rosulabryum capillare_ (Hedwig) J.R. Spence [ _Bryum capillare_ Hedwig ]. On moist to wet shady soil and humus, at bases of trees and rocks, often densely tufted and then suggestive of _Mnium_ patches, or scattered among other mosses.

_Rosulabryum laevifilum_ (Syed) Ochyra [ _Bryum laevifilum_ Syed ]. On bark and rotten wood.

_Leptostomopsis_


_Rhodobryum_

_Rhodobryum ontariense_ (Kindberg) Kindberg On rich forest soils and humus, rotten logs, tree bases, and moist rocks. _Rhodobryum ontariense_ might be confused with _Roellobryon roellii_ (Brotherus) Ochyra (Roellobryaceae and not yet found in New Mexico), as both have quite large leaves in rosulate apical tufts. They may distinguished by the following:

A plants with secondary erect stems arising from primary stoloniferous/rhizomatous stems, the rosettes of leaves borne at the distal ends of the secondary erect stems; margins revolute to beyond mid-leaf................................. _Rhodobryum_
Plants with primary erect stems only, which bear the rosettes of leaves, stoloniferous/rhizomatous stems absent; margins revolute proximally, plane above mid-leaf.

Roellobryon roellii (Röll) Crum [Bryum sandbergii Holzinger].

Bryum argenteum

Bryum lanatum

Gemmabryum caespiticium

Gemmabryum dichotomum
Ptychostomum pseudotriquetrum

Rhodobryum ontariense

Rosulabryum andicola
**Family BRYOXPHIACEAE**

Plants acrocarpous, the shoots shiny, on rock; leaves keeled-conduplicate and overlapping in two rows, uni-costate; laminal cells linear to subquadrate, smooth.

*Rosulabryum flaccidum*

*Rosulabryum laevifilum*

*Family CALLIERGONACEAE*

1 Leaves straight ........................................... .......................... **Straminergon**

1 Leaves mostly falcate

2 Alar group mostly large and well-marked; translucent red pigment common; costa strong .......... .......................... .......................... **Sarmentypnum**

2 Alar group well-marked to obscure; costa weak to strong; translucent red pigment rare .......... .......................... .......................... **Warnstorfia**

*Sarmentypnum exannulatum* (Schimper) Hedenäs  

[Warnstorfia exannulata (Schimper) Loeske]

**Straminergon**

Plants medium-sized, pale or whitish green to yellowish green. Stems irregularly branched; pseudoparaphyllia present. Leaves straight, ovate, concave, not plicate, the apex abruptly narrowed to a cuculate apex; margins entire, plane; costa single, ending above mid-leaf; medial cells linear, sinuate; alar cells quadrate to short-rectangular, enlarged. Dioicous. Capsules horizontal, curved.

*Straminergon stramineum* (Bridel) Hedenäs  

[Calliergon stramineum (Bridel) Kindberg]. Wet meadows and boggy ground (not calcareous) at mid- to high elevations.

[Dona].

**Warnstorfia**

Plants medium-sized, green, yellowish, brownish, to reddish. Stems sparsely to abundantly branched; pseudoparaphyllia present. Leaves straight to falcate, generally ovate, not plicate, narrowed to an acuminate apex; margins plane, entire to denticulate; costa single, ending beyond mid-leaf; medial cells linear to rhomboidal; alar cells quadrate to rectangular, hyaline, thin-walled, somewhat inflated. Autoicous. Capsules horizontal, curved.

**Warnstorfia fluitans** (Hedwig) Loeske  

[Drepanoclados fluitans (Hedwig) Warnstorf, Hypnum fluitans Hedwig]. Wet meadows and bogs or fens, slow streams and ponds, often submerged; known only from quiet ponds and marshy ground of Alamo Canyon in the Valles Caldera National Preserve.
Family CLIMACIACEAE
Plants pleurocarpous, usually dendroid in form, cushion-forming, the primary stems procumbent, the secondary stems erect, with a central strand; leaves heteromorphic, plicate, ecostate (stem) or uni-costate (branch), the margins dentate distally; laminal cells narrowly hexagonal to rhomboidal, smooth.

Climacium
1 Branch leaf medial cells mostly 7-13:1; stem leaf apices obtuse, often abruptly apiculate; branch leaf bases not or only somewhat auriculate, the apices obtuse......................C. dendroides
1 Branch leaf medial cells mostly 3-6:1; stem leaf apices broadly to sharply acute, sometimes apiculate; branch leaf bases sharply flexuose-auriculate, the apices acute ..........C. americanum

Climacium americanum Bridel Apparently uncommon or rare, known only from a single report; warrants verification.

Climacium dendroides (Hedwig) Weber & Mohr Wet soil and boggy ground along springs, streams, and brooks, often covering wet rocks, sometimes on rotten logs. Upright main shoots of Pleurozium can mimic the upright, tree-like secondary shoots of Climacium, but the former occurs on drier forest floors, and has red stems and thick-walled, orange-brown alar cells.

[Catr, Colf, Mora, RioA, SanM, Sand, Taos].

Family DICRANACEAE
Plants mostly acrocarpous; stems often tomentose proximally, with a central strand; leaves uni-costate; laminal cells smooth.

1 Costa broad, occupying ½ or more of leaf base
2 Dense clusters of tiny spindle-shaped brood bodies produced in axils of upper leaves; plants in yellowish to light greenish mats; leaves 2-3 mm long.............................................Brothera
2 Brood bodies absent; plants in whitish mats; leaves 2-8 mm long.............Paraleucobryum
1 Costa narrow, occupying less than 1/3 of leaf base
2 Alar cells differentiated, inflated, hyaline or sometimes orangish or brownish, often bi-stratose ..................................................Dicranum
2 Alar cells not differentiated, or if so, then uni-stratose
3 Leaves flexuose, falcate-secund, only rarely somewhat crisped when dry...........Dicranella
3 Leaves crisped and contorted when dry
4 Leaf cells with a large papilla on both the adaxial and abaxial surfaces; capsules smooth when dry.................................................................Dichodontium
4 Leaf cells smooth (with very obscure longitudinal cuticular striations in Dicranoweisia crispus); capsules smooth or wrinkled when dry
5 Leaves with a lanceolate base, not sheathing; capsule not strumose (with a goiter-like swelling at the base)
6 Lamina serrulate distally .........................................................Rhabdoweisia
6 Lamina entire throughout ....................................................Dicranoweisia
5 Leaves with an ovate or obovate base, strongly sheathing; capsule strumose or not
7 Sporophytes single; capsules strumose, somewhat furrowed when dry; leaves a dirty brown-gray when viewed in preparation through the microscope (at least O. wahlenbergii).................................................................Oncophorus
7 Sporophytes clustered; capsules not strumose nor furrowed when dry; leaves clear yellow when viewed in preparation through the microscope .........Symblepharis
Brothera  
*Brothera leana* (Sullivant) Müller On dry rotting stumps in shade; known from a single collection in Grant County.

Dichodontium  
*Dichodontium pellucidum* (Hedwig) Schimper. On damp or wet soil and rocks, along streams, wet meadows, and seeps, in the mountains. [Taos].

Dicranella  
*Dicranella varia* (Hedwig) Schimper On damp, shaded soil, streambanks, seepy ground.

Dicranoweisia  
1 Leaf margins strongly and widely recurved in many leaves; lamina smooth, uni-stratose except for the margins; alar cells not differentiated .................................................. *D. cirrata*
1 Leaf margins plane, erect to incurved, sometimes narrowly recurved outward; lamina usually longitudinally striate with narrow cuticular ridges, these appearing as papillae in cross-section, uni-stratose to bi-stratose in the upper half; alar cells sometimes differentiated........... *D. crispula*

Dicranoweisia cirrata* (Hedwig) Lindberg ex Milde On tree trunks and rotting logs.

*Dicranoweisia crispula* (Hedwig) Lindberg ex Milde In moist rock crevices.

Dicranum  
1 Leaf tips mostly deciduous and absent............................................................... *D. tauricum*
1 Leaf tips mostly present
2 Leaves mostly strongly coiled or crisped when dry
3 Proximal leaf cells mostly not pitted; alar cells 1-stratose; capsule generally straight and erect; very common mosses, nearly always on rotting stumps and logs ............ *D. montanum*
3 Proximal leaf cells pitted; alar cells 2-stratose; capsule generally curved; quite uncommon mosses, mostly on humus, soil, or rock
4 Leaves tubulose in the distal half.......................................................... *D. muehlenbeckii*
4 Leaves keeled in the distal half
5 Leaves strongly crisped when dry; forest or foothill habitats ............ *D. brevifolium*
5 Leaves slightly curled when dry; alpine tundra................................. *D. acutifolium*
2 Leaves mostly straight to curved or falcate when dry, but not coiled nor crisped
6 Alar cells 1-stratose; capsules generally straight and erect................. *D. rhabdocarpum*
6 Alar cells 2-stratose; capsules generally curved
7 Distal leaf cells elongate, sinuose, and distinctly pitted ....................... *D. scoparium*
7 Distal leaf cells short (quadrate to short-rectangular), neither sinuose nor pitted
8 Leaves with distal margins ± involute; leaf cells smooth to slightly papillose on abaxial surface in distal part of leaf................................. *D. acutifolium*
8 Leaves with distal margins erect; leaf cells papillose on abaxial surface in distal part of leaf.................................................. *D. fuscescens*

*Dicranum acutifolium* (Lindberg & Arnell) Jensen On peaty soil in the alpine.

*Dicranum brevifolium* (Lindberg) Lindberg On humus or soil over rock.

*Dicranum fuscescens* Turner var. *fuscescens* On tree trunks and bases, rotten stumps and logs, soil, and rock outcrops.

*Dicranum muehlenbeckii* Bruch & Schimper On soil, often over boulders and among rocks.

*Dicranum montanum* Hedwig Plants often with small detachable brood plantlets that sit on the surface of the clump. Other species with strongly crispate leaves are *D. brevifolium* and *D. muehlenbeckii*.

*Dicranum rhabdocarpum* Sullivant On soil, soil over rock, and rotting wood.

*Dicranum scoparium* Hedwig On soil, over rock, decaying stumps and logs, tree bases.

*Dicranum tauricum* Sapjegin Mostly on rotting logs or stumps; with straight and erect capsules [Sand].

Oncophorus  
1 Leaves keeled or folded, the margins revolute, not sheathing at the base, gradually narrowed to the acumen .......................................................... *O. virens*
1 Leaves flat, the margins revolute, not sheathing at the base, abruptly narrowed to the acumen .......................................................... *O. wahlenbergii*

*Oncophorus virens* (Hedwig) Bridel. Moist to wet soil, rocks, and rotting wood, streamside, wet meadows, in the mountains.

*Oncophorus wahlenbergii* Bridel Rotting logs, moist soil and humus, sometimes on rock.
**Paraleucobryum**

1 Costa with longitudinal striations on abaxial surface, formed by rows of teeth evident at high magnifications; leaf margins serrulate near the apex .............................................. *P. longifolium*

1 Costa smooth on abaxial surface; leaf margins entire or rarely with a few teeth at the apex.............

**Paraleucobryum enerve** (Thedenius) Loeske  On soil.

**Paraleucobryum longifolium** (Hedwig) Loeske  On soil over boulders and cliffs.

**Rhabdoweisia**

* Rhabdoweisia crispata* (Dickson ex Withering) Lindberg  Known only from a single collection in the Pinos Altos Mountains in crevices of moist, shaded, decaying, downed trunks.

**Symblepharis**

* Symblepharis vaginata* (Hooker) Wijk & Margadant  [*Symblepharis helicophylla* Montagne].

Rotting logs and bark.

*Brothera leana*

*Dicranoweisia crispula*

*Dicranum montanum*
Dicranum rhabdocarpum

Dicranum scoparium

Paraleucobryum enerve
Paraleucobryum longifolium

Symblepharis vaginata

Family DITRICHACEAE

Plants acrocarpous; stems not tomentose, with a central strand; leaves lanceolate to subulate, distichous or not, uni-costate, the apices acute to acuminate; laminal cells quadrate to linear, smooth.

1 Leaves in two rows, the base ± sheathing, abruptly narrowed to a ± roughened subula ..................

.......................................................... Distichium

1 Leaves not as above

2 Leaves glaucous blue-green .................................................. Saelania

2 Leaves yellow-green to green, never glaucous

3 Leaves lanceolate to triangular-ovate, the margins recurved; seta reddish purple to orangish; capsule strongly sulcate when dry, often strumose .................. Ceratodon

3 Leaves lanceolate to subulate, the margins mostly plane; seta pale yellow to reddish brown; capsule not sulcate when dry, not strumose ........................................... Ditrichum

Ceratodon

Ceratodon purpureus (Hedwig) Bridel. Usually on exposed soil, wet to dry places, but also on wood and in crevices where soil collects on rocks, and known on large obsidian boulders in the Valles Caldera (Sandoval County). Plants are notoriously variable, in both form and habitat, usually preferring disturbed, well-drained sites, but found almost everywhere. Leaf margins are recurved almost their entire length, and the apices usually have at least a few coarse teeth (but also known to be entire). Capsules are common, red-brown, inclined at maturity, often swollen at the base, and strongly furrowed (sulcate) when mature.

We have two subspecies:

a Seta reddish to dark brown; capsule inclined to horizontal, strumose, strongly sulcate when dry...subsp. purpureus

a Seta pale yellow to orangish; capsule slightly inclined to erect, not or weakly strumose, smooth to sulcate when dry... subsp. stenocarpus (Bruch & Schimper) Dixon

Distichium

Distichium capillaceum (Hedwig) Bruch & Schimper On wet or damp stream banks, rotten logs, rocks, seeps, dripping cliffs, often in crevices.

Ditrichum

1 Stems 1-4 cm long; leaves to 3 mm long, from an ovate-sheathing base sharply contracted to the subula; lamina cells near costa with weakly nodulose longitudinal walls; plants commonly fruiting ................................................................. D. flexicaule

1 Stems to 7 cm or more long; leaves from an elongate-ovate base tapering gradually to the long slender subula; basal laminal cells with weakly to strongly nodulose longitudinal walls; plants rarely found fruiting ................................................................. D. gracile

Ceratodon

Ceratodon purpureus (Hedwig) Bridel. Usually on exposed soil, wet to dry places, but also on wood and in crevices where soil collects on rocks, and known on large obsidian boulders in the Valles Caldera (Sandoval County). Plants are notoriously variable, in both form and habitat, usually preferring disturbed, well-drained sites, but found almost everywhere. Leaf margins are recurved almost their entire length, and the apices usually have at least a few coarse teeth (but also known to be entire). Capsules are common, red-brown, inclined at maturity, often swollen at the base, and strongly furrowed (sulcate) when mature.

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a Seta reddish to dark brown; capsule inclined to horizontal, strumose, strongly sulcate when dry...subsp. purpureus

a Seta pale yellow to orangish; capsule slightly inclined to erect, not or weakly strumose, smooth to sulcate when dry... subsp. stenocarpus (Bruch & Schimper) Dixon

Distichium

Distichium capillaceum (Hedwig) Bruch & Schimper On wet or damp stream banks, rotten logs, rocks, seeps, dripping cliffs, often in crevices.

Ditrichum

1 Stems 1-4 cm long; leaves to 3 mm long, from an ovate-sheathing base sharply contracted to the subula; lamina cells near costa with weakly nodulose longitudinal walls; plants commonly fruiting ................................................................. D. flexicaule

1 Stems to 7 cm or more long; leaves from an elongate-ovate base tapering gradually to the long slender subula; basal laminal cells with weakly to strongly nodulose longitudinal walls; plants rarely found fruiting ................................................................. D. gracile
**Ditrichum flexicaule** (Schwägrichen) Hampe  On dry rocks, cliffs, ledges, and crevices.

**Ditrichum gracile** (Mitten) Kuntze  On soil and dry rocks.

**Saelania**

**Saelania glaucescens** (Hedwig) Brotherus  *Didymodon trifarius* (Hedwig) Rohling.  Shaded soil banks and overhangs.

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**Ceratodon purpureus**

**Distichium capillaceum**

**Family ENCALYPTACEAE**

Plants acrocarpous, on soil; leaves uni-costate; laminal cells isodiametric distally, much elongated proximally, papillose; calyptrae very large and covering the capsule.

**Encalypta**

1 Some or all vegetative leaves with distinct awns or hair points; apex acute............*E. rhaptocarpa*
1 Vegetative leaves without awns or hair points; apex obtuse to mucronate
   2 Plants usually sterile; stems with usually copious amounts of filiform rhizoidal gemmae ...........
2 Plants commonly with capsules; stems lacking gemmae
3 Leaves 4-6 mm long, the margins recurved below mid-leaf; calyptra fringed at base........
3 Leaves 3-4 mm long, the margins plane or weakly incurved; calyptra not fringed at base.....

Encalypta ciliata Hedwig  Rock crevices and soil.
Encalypta procera Bruch  Calcareous soil and rock, crevices, and ledges. As yet known only from Holy Ghost Canyon in San Miguel County.
Encalypta rhaptocarpa Schwägrichen  Soil and thin soil over rock.
Encalypta vulgaris Hedwig  Thin soil over rock.

Family ENTODONTACEAE
Plants pleurocarpous; primary stems yellow or red; leaves ecostate to double costate, the costae not extending past mid-leaf, the margins entire; laminal cells elongate, smooth.

**Entodon**

1 Leaves broadly rounded at the apex; alar cells 2- to 3-stratose................. *E. concinnus*
1 Leaves gradually or abruptly acute to acuminate; alar cells 1-stratose

2 Leaves abruptly acute to acuminate, the short, narrowed tips noticeably diverging from the concave body of the blade when dry; terminal cell of leaf 1-2:1; exostome teeth papillose to smooth proximally

3 Most costae ¼–½ the length of the blade; leaves 0.8-1.5 mm long; exostome teeth papillose proximally .................................................. *E. beyrichii*
3 Most costae to ½ the length of the blade; leaves 1-2 mm long; exostome teeth ± smooth proximally ............................................. *E. seductrix*

2 Leaves gradually narrowed, the longer tips variously disposed, the body of the blade less concave; terminal cell of leaf various; exostome teeth cross-striolate proximally

4 Shoots at least somewhat complanate; stem leaves 2-2.2 mm long; terminal cell of leaf elongate, (3.5)4-5:1; annulus absent ........................................... *E. schleicheri*
4 Shoots obviously teret-julaceous; stem leaves 1.8-2 mm long; terminal cell of leaf scarcely longer than wide, 1-2:1; annulus differentiated .................................. *E. sullivantii*

**Entodon concinnus** (De Notaris) Paris  
*Entodon orthocarpus* (Bridel) Lindberg. On shaded moist ground and humus, sometimes bark, in the forests.

**Entodon schleicheri** (Schimper) Demeter On shaded moist ground, and tree bases (oak), mostly in the southern mountains, known from only a few localities. These plants were reported as *Entodon cladorrhizons* (Hedwig) Müller Hal. by earlier workers, but that species occurs eastward.  
[Catr, Oter, Linc, SanM].

**Entodon seductrix** (Hedwig) Muller Hal. On wood, rocks, cliffs, and soil in the mountains.

**Entodon sullivantii** (Müller Hal.) Lindberg On rocks and cliffs in moist woods.
Family FABRONIACEAE

Plants pleurocarpous; primary stems homomallous; paraphyllia absent; leaves ovate to deltoid, ecostate or uni-costate, the apices acute to acuminate; margins flat; laminal cells elongated.

Fabronia
1 Leaf margins wavy- to short-toothed, the teeth one-celled; leaf apex acute to acuminate, the apex much shorter than the blade ................................................. F. ciliaris
1 Leaf margins conspicuously serrate to jagged-toothed, the teeth two-celled; leaf apex long-attenuate, the tip often as long as the blade or longer ................................................. F. pusilla

Fabronia ciliaris (Bridel) Bridel [Fabronia wrightii Sullivant]. On rocks and tree bark.

Fabronia pusilla Raddi On rocks and tree bark.

Family FISSIDENTACEAE

Plants mostly acrocarpous, the shoots complanate; stems with a central strand; leaves distichous, clasping the stem, each leaf comprising a boat-shaped, clasping basal part, beyond which extends an abaxial, equitant wing with the nerve prolonged out into it; laminal cells isodiametric, papillose.

Fissidens
1 Plants aquatic, attached to various substrates in stagnant or flowing water, up to 12 cm long.............. F. fontanus
1 Plants terrestrial, rarely as much as 5 cm long
2 Leaves strongly coiled, curled, or twisted when dry ................................................. F. crispus
2 Leaves flat or nearly so when dry
3 Leaf apices rounded to obtuse, not apiculate ................................................. F. obtusifolius
3 Most leaf apices at least apiculate, to acute
4 Laminal cells mammillose, with a single nipple-like projection ......................................... F. littlei
4 Laminal cells bulging to flat, without a nipple-like projection
5 Leaves mostly 1-2.5 mm long; usually moist habitats ......................................... F. bryoides
5 Leaves mostly 0.7-1 mm long; usually dry habitats ......................................... F. sublimbatus

Fissidens bryoides Hedwig On soil and rocks in moist shaded places.

Fissidens crispus Montagne Moist soil, often near water.

Fissidens fontanus (B.-Pyl.) Steudel In stagnant and slow-moving water, attached to various substrates.

Fissidens littlei (Williams) Grout [Moenkemeyera littlei Williams]. Known only from gypsum sinks of the Jornada Plain in Doña Ana County.
**Fissidens obtusifolius** Wilson var. *acuminatus* Grout  On moist limestone substrates along streams.

**Fissidens sublimbatus** Grout  On soil, often in overhangs or shady places.

*Fissidens bryoides*

*Fissidens crispus*

*Fissidens littlei*

*Fissidens sublimbatus*
**Family FONTINALACEAE**

Plants pleurocarpous or cladocarpous, aquatic, straggling, with shoots up to a meter in length; stems 3-side; leaves 3-ranked, ecostate; margins flat, entire; laminal cells smooth.

**Fontinalis**

1 Leaves usually plane ................................................. \textit{F. hypnoides}
2 Leaves usually keeled or folded
   1 Ends of leafy stems and branches conspicuously elongated; leaf keel only slightly curved; leaf apices acute ................................................. \textit{F. neomexicana}
   2 Ends of leafy stems and branches not conspicuously elongated; leaf keel curved from the insertion to the apex of the leaf; leaf apices subobtuse to broadly obtuse ........ 

\textit{Fontinalis hypnoides} Hartman Generally in slow-moving water.

\textit{Fontinalis antipyretica} Hedwig Generally in slow-moving water.

\textit{Fontinalis neomexicana} Sullivant & Lesquereux Often in swift-moving water.

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**Family FUNARIACEAE**

Plants acrocarpous, on soil; stems often with comal tufts of leaves, not tomentose; leaves unicostate; laminal cells smooth

1 Calyptra large and four-angled, completely enclosing the mature capsule .............. \textit{Pyramidula}
2 Calyptra smaller than the mature capsule (but may be larger than very young capsules), not angled nor persistent
   1 Capsules inclined and asymmetric; peristome double, the endostome well-developed to somewhat rudimentary ................................................. \textit{Funaria}
   2 Capsules erect and ± symmetric; peristome single to absent
      1 Capsules sub-cylindric to narrowly pyriform; calyptra cucullate ............ \textit{Entosthodon}
      2 Capsules urn-shaped to pyriform; calyptra mitrate .......................... \textit{Physcomitrium}

\textit{Entosthodon attenuatus} (Dickson) Bryhn Disturbed wet sandy soils along creeks and streams.
Entosthodon rubiginosus (Williams) Grout  Sandy soil along ditches and streams.

Funaria
1 Setae mostly 20-45 mm long; annulus present, large and revoluble .................. F. hygrometrica
1 Setae 3-20 mm long; annulus present or absent
   2 Setae 3-6 mm long; distal leaves with a long, flexuose, excurrent costa with a hyaline tip ........ F. apiculatopilosa
   2 Setae 6-20 mm long; distal leaves acute to narrowly acuminate, the costa percurrent to excurrent, straight and concolorous
   3 Annulus present, large, revoluble
      4 Endostome segments at least ⅔ the length of the exostome teeth ............. F. hygrometrica
      4 Endostome segments less than ⅔ the length of the exostome teeth ............. F. flavicans
   3 Annulus absent ............................................................................................. F. muhlenbergii
   5 Costa ending in a narrowly acuminate tip, or excurrent ................................ F. americana
   5 Costa ending before the slender, filiform acuminat tip ................................. F. muhlenbergii

Funaria americana Lindberg  On soil.
Funaria apiculatopilosa Cardot [Funaria orcuttii Bartram].  On sandy soils.
Funaria flavicans Michaux  Barren soil.
Funaria hygrometrica Hedwig  In disturbed sites, often burned soil or wood.
We have two varieties:
   a Capsule horizontal to pendant, curved, the neck less tapered than below, the mouth narrow...var. hygrometrica  [Funaria hygrometrica Hedwig var. utahensis Grout].
   a Capsule inclined to nearly erect, straight or weakly curved, narrowly tapered to a long slender neck, the mouth wide...var. calvescens (Schwägrichen) Montagne
Funaria muhlenbergii Turner  Ephemeral on seasonally moist soil and under rock overhangs.

Physcomitrium
Physcomitrium pyriforme  (Hedwig) Hampe  Wet soil of meadows, springs, and other moist sites.
Pyramidula
Pyramidula tetragona (Bridel) Bridel  On soil.

Funaria hygrometrica

Family GIGASPERMACEAE
Plants acrocarpous, on soil; gametophyte united by an underground rhizomatous aphyllous stem; capsules often immersed.

Lorentziella
Lorentziella imbricata (Mitten) Brotherus  Known only from loose desert soil under Larrea on White Sands Missile Range.

Family GRIMMIACEAE
Plants acrocarpous or cladocarpous, often dark green or blackish, mostly cushion-forming; leaves mostly not crisped when dry, uni-costate; margins uni- to multi-stratose, usually entire; laminal cells mostly quadrate, papillose or smooth.
1 Columella usually attached to operculum and deciduous with it; calytra small, covering only the operculum, mitrate (with several splits or clefts around the base) or cuculate (with only one split at the base, like a hood), smooth; capsule immersed to emergent, longer than the seta; seta straight; leaf margins plane to recurved ......................................................... Schistidium
1 Seta attached centrally to the capsule base; capsule immersed to exserted, smooth to plicate, not
2 Calyptra large, covering at least ½ the length of the capsule, campanulate-mitrate, plicate; 
3 Calyptra large, covering at least ½ the length of the capsule, campanulate-mitrate, plicate; 
4 Calyptra large, covering at least ½ the length of the capsule, campanulate-mitrate, plicate; 
5 Leaves 2
6 Leaves 2
7 Operculum mammilllose; cells of the basal leaf margins quadrate to short-rectangular .......... 
8 Leaves 2
9 Leaves ovate-lanceolate from an ovate base; basal marginal leaf cells quadrate to long-rectangular; 
10 Margins plane or incurved 

1 Columella not attached to the operculum; calyptra small to large, mitrate, cucullate, erose, 
smooth or plicate; capsule exerted, occasionally immersed; seta straight, sigmoid, or arcuate; 
leaf margins plane, recurved, or incurved 
2 Calytra small, less than ½ the length of the capsule, mitrate or cucullate, smooth; awns on 
distal leaves usually shorter than the blades .......................................................... Grimma
2 Calytra large, covering at least ½ the length of the capsule, campanulate-mitrate, plicate; 
awns on distal leaves typically longer than the blades 
3 Stem leaves lanceolate to ovate, keeled distally, plicate or not; distal blades 1- to 2-
stratose; plants olivaceous to blackish green, acidiphilic ..................................... Coscinodon
3 Stem leaves broadly ovate to obovate, concave or only somewhat keeled distally, not 
plicate; distal blades 1-stratose; plants yellow-green to dark olivaceous, calciphilic .......

Jaffueliobryum

Coscinodon
1 Leaves not plicate; blades 1-stratose distally, the margins plane or recurved on one side at 
midleaf.................................................................................................................. C. calyptratus
1 Leaves plicate at least in the distal portions; blades 2-stratose distally, the margins incurved 
distally ........................................................................................................................ C. cribrosus

Coscinodon calyptratus (Hooker) C. Jensen ex Kindberg [Grimma calyptrata Hooker]. On 
boulders, ledges, and outcrops, 

Coscinodon cribrosus (Hedwig) Spruce [Grimma cribrosa Hedwig]. On boulders and rocky 
outcrops.

Grimma
1 Seta attached eccentrically to the capsule base; capsule immersed, smooth, swollen on one side 
2 Distal leaves broadly concave, the blades 2-stratose with 2-stratose margins; annulus 
3 Basal leaf cells thin-walled; guide cells indistinct or indistinguishable from the laminal 
cells, their adaxial cell walls not or slightly thickened; peristome rudimentary..............
4 Distal leaves concave-keeled, the blades 1-stratose or with 2-stratose patches, the margins 1-
or 2-stratose; annulus absent or reduced to 1-2 rows of small cells; operculum mammilllose 
5 Leaves merely 1-stratose distally, the margins at most narrowly 2-stratose, with one or both 
margins recurved 
6 Leaves gradually tapering to the awns, the apices narrowed; plants dioicoic....................
7 Operculum rostrate; cells of the basal leaf margins quadrate to short-rectangular .......... 
8 Leaves concave; costa not prominent; margins plane or incurved; plants dioicoic 
9 Leaves oblong-ovate to oblong-lanceolate; basal marginal leaf cells oblate to quadrate; 
costa broad at base; awn broadly attached and decurrent ........................................ G. laevigata

Jaffueliobryum

G. sesitana), the margins incurred, plane, or recurved 
8 Leaves keeled; costa prominent; margins recurved, plane, or incurred; plants autoicoic or 
dioicoic 
10 Margins plane or incurved
11 Leaf margins plane throughout; basal marginal laminal cells short- to long-rectangular

12 Basal marginal cells short- to long-rectangular, rarely hyaline, with thickened transverse walls; annulus small, of one row of quadrate cells, not revoluble; calyptra cucullate, .................. G. sessitana
12 Basal marginal cells long-rectangular, hyaline, the transverse walls evenly thin; annulus large, of 2 rows of rectangular cells, revoluble; calyptra mitrate. .................................................. G. donniana

11 Leaf margins incurved; basal juxtacostal leaf cells quadrate to short-rectangular; distal juxtacostal leaf cells 2-stratose

13 Basal juxtacostal leaf cells short- to long-rectangular, distinct from the quadrate to short-rectangular basal marginal cells; medial leaf cells rounded, thick-walled ............................................ G. montana
13 Basal juxtacostal and marginal leaf cells quadrate to short-rectangular; medial leaf cells quadrate to short-rectangular, thin-walled .................. G. alpestris

10 Margins recurved on one or both sides

14 Sporophytes present

15 Capsule immersed

16 Stem central strand absent, the epidermis thick; distal leaf margins 3(4)-stratose, thicker than juxtacostal blade, usually both margins recurved...... ......................................................................................... G. pilifera
16 Stem central strand present, the epidermis thin; distal leaf margins 2-stratose, not thickened, one or both margins recurved

17 Stems 0.5-1 cm long, ± unbranched; margins plane to recurved on one side; basal juxtacostal laminal cells rectangular, with thin to slightly incrassate walls ............................................ G. texicana
17 Stems 1-3 cm long, branched; margins frequently recurved on two sides; basal juxtacostal laminal cells elongate with incrassate and sinuous walls ................................................. G. pilifera

15 Capsule exserted

18 Seta arcuate; plants dioicus ................................................. G. elatior
18 Seta straight; plants autoicous

19 Annulus small, of one row of quadrate cells; basal juxtacostal cells straight and thin-walled............................... G. sessitana
19 Annulus prominent, of 2 rows of rectangular cells; basal juxtacostal cells sinuous and thick-walled .................. G. longirostris

14 Sporophytes absent

20 Basal juxtacostal cells straight, thin-walled; distal juxtacostal cells 1-stratose, the cells often bulging; plants small (less than 1 cm long), blackish; moist, alpine habitats ......................................................... G. sessitana
20 Basal juxtacostal cells sinuous, thick-walled; distal juxtacostal cells at least 2-stratose, the cells not bulging; plants robust (greater than 1 cm long), yellow-green to very dark olivaceous; dry habitats, widely distributed

21 Leaf margins 2-stratose, not thickened; stem central strand present, the epidermis thin

22 Plants autoicous; costa transverse section reniform; leaves sheathing ...

................................................................. G. longirostris
22 Plants dioicous; costa transverse section semi-circular; leaves not sheathing

23 Stems 0.5-1 cm long, ± unbranched; margins plane to recurved on one side; basal juxtacostal laminal cells rectangular, with thin to slightly incrassate walls ............................................ G. texicana
23 Stems 1-3 cm long, branched; margins frequently recurved on two sides; basal juxtacostal laminal cells elongate with incrassate and sinuous walls ................................................. G. pilifera

21 Leaf margins multi-stratose and thickened; stem central strand absent, the epidermis thick
24 Leaves narrowly lanceolate from an ovate base, usually narrowly recurved on both margins; distal lamina without multi-stratose bands, never papillose..........................**G. pilifera**

24 Leaves broadly lanceolate, broadly recurved on one margin; distal lamina with multi-stratose bands, occasionally papillose .... **G. elatior**

**Grimmia alpestris** (Weber & Mohr) Schleicher [Grimmia ungeri of New Mexico reports]. On exposed granite and sandstone.

**Grimmia anodon** Bruch & Schimper On exposed calcareous rock.

**Grimmia donniana** Smith Not yet known from New Mexico, but to be looked for on rocks in the northern mountains.

**Grimmia elatior** Bruch ex Balsamo-Crivelli & De Notaris On exposed rock.

**Grimmia laevigata** (Bridel) Bridel [Grimmia americana Bartram]. On dry rock.

**Grimmia longirostris** Hooker On dry rock.

**Grimmia montana** Bruch & Schimper On exposed rock.

**Grimmia orbicularis** Bruch ex Wilson On exposed rock.

**Grimmia ovalis** (Hedwig) Lindberg [Dicranum ovale Hedwig]. Dry rocks in the mountains.

**Grimmia bernoullii** Mueller Hal. has been reported from the state, but the specimens were later determined (at least by some) to be **G. ovalis**; these specimens are distinguished by the costa broad at the base and disappearing about midleaf (in bernoullii).

**Grimmia pilifera** Beauvois [Grimmia arizonae Renault & Cardot]. Exposed to shaded rocks.

**Grimmia plagiotopodia** Hedwig On exposed calcareous rocks.

**Grimmia pulvinata** (Hedwig) Smith On rocks and tree trunks.

**Grimmia sessitana** De Notaris [Grimmia tenerrima Renault & Cardot]. On rocks at high elevations.

**Grimmia texicana** Greven On rocks in the southern mountains and foothills. May be only a form of **G. pilifera**.

**Grimmia tergestina** Bruch & Schimper [Grimmia crinitoleucophaea Cardot, Grimmia poecilostoma Cardot & Sebille]. On rocks.

**Grimmia trichophylla** Greville On rocks.

**Jaffueliobryum**

Plants tiny, in dense cushions, dark to light-colored, 3-15 mm high, often concealed by the soil. Stems erect, sparsely branched; paraphyllia absent. Leaves ovate to obovate, concave to somewhat keeled, 0.5-1.2 mm long; margins plane, usually entire; lamina 1-stratose; costa prominent; awn short to long; medial cells isodiametric to elongate; alar cells not differentiated. Autoicous; Capsule erect, immersed, on a straight seta; calyptra covering 1/2 or more of the capsule.

1 Distal portion of the leaf acute to acuminate; leaves distinctly keeled; proximal stem leaves mostly spreading.................................................................**J. raui**

1 Distal portion of the leaf broadly acute-rounded; leaves not keeled; proximal stem leaves mostly appressed ..........................................................................................**J. wrightii**

**Jaffueliobryum raui** (Austin) Thériot [Grimmia raui Austin]. On dry sandstone and limestone rock in dry regions; less common than the subsequent and perhaps at higher (or more mesic) elevations.

[Guad, Quay].

**Jaffueliobryum wrightii** (Sullivant in Gray) Thériot [Coscinodon wrightii Sullivant in Gray, Grimmia wrightii (Sullivant in Gray) Austin]. Dry sandstone and limestone rock in arid regions; more common than the previous and perhaps at lower (or more xeric) elevations.

[Chav, Dona, Eddy, Hida, Linc, McKi, Oter, RioA, Sant, Sier, Soco, Torr].

**Schistidium**

1 Plants usually along water courses and lakes, often submerged or in splash zones, sometimes also along seasonally wet cliffs or ledges; costa usually sub-percurrent or percurrent, sometimes excurrent as a hyaline cell; awns rare .................................................................**S. rivulare**

1 Plants usually in drier habitats; costa percurrent or excurrent as an awn

2 Peristome absent, rudimentary, or very short...........................................**S. atrofuscum**

2 Peristome well-developed

3 Basal marginal cells, at least of perichaetial leaves, elongate-rectangular, often clear; mid- and distal cells usually obviously sinuous...........................................**S. frigidum**

3 Basal marginal cells quadrate or short-rectangular, not obviously elongate when compared to medial cells, clear or opaque; mid- to distal cells sinuous or not
4 Transverse walls of basal marginal cells about same thickness as the longitudinal walls; most or many cells obviously sinuous. .................................................. S. dupretii

4 Transverse walls of basal marginal cells thicker than the longitudinal walls; few cells obviously sinuous

5 Margins of leaf blades commonly plane (at least one margin); awns of upper leaves obvious, commonly ¼ to ½ the blade length ........................................ S. ambiguum

5 Margins of leaf blades commonly recurved to revolute; awns of upper leaves absent to short, rarely as much as ¼ the blade length .................................. S. confertum

Schistidium ambiguum Sullivant On rocks; Santa Fe and Grant counties. This may be conspecific with Schistidium confertum, which would then be the correct name.

Schistidium atrofuscum (Schimper) Limpricht On limestone.

Schistidium confertum (Funck) Bruch & Schimper [Grimmia apocarpa Hedwig var. conferta (Funck) Sprengel]. On rocks; not known from New Mexico, but very common in Colorado; this may be conspecific with Schistidium ambiguum.

Schistidium dupretii (Thériot) W.A. Weber On exposed rock in dry habitats.

Schistidium frigidum H.H. Blom On rocks.

Schistidium rivulare (Bridel) Podpera [Grimmia alpicola of Amer. authors, Grimmia alpicola Swartz ex Hedwig var. rivularis (Bridel) Wahlenberg, Schistidium alpicola of Amer. authors, Schistidium rivulare (Bridel) Podpera var. latifolium (Zetterstedt) Crum & Anderson]. On wet to dry rocks along water courses and lakes or ponds, often submerged or in splash zones, sometimes also along seasonally wet cliffs and ledges.

[Bern, Dona, Gran, Linc, Mora, Oter, Sand, Sant, Sier, Taos].

Coscinodon calyptratus

Coscinodon cribrosus
Grimmia alpestris

Grimmia anodon

Grimmia laevigata

Grimmia longirostris
Jaffueliobryum wrightii

Schistidium ambiguum
Schistidium frigidum

Schistidium papillosum
### Schistidium rivulare

**Family HEDWIGIACEAE**

Plants acrocarpous, but with limited branching; stems lacking a central strand; leaves ecostate, the apices often hyaline; margins revolute at least below; laminal cells papillose.

1. Leaf apices hyaline ................................................................. **Hedwigia**
2. Leaf apices colored ........................................................................ **Braunia**

**Braunia**

1. Leaf margins revolute from the base up to about \( \frac{3}{4} \) the leaf length; distal leaf cells rectangular, about \( 2-2.5:1 \), the cell walls sinuose........................................................................ **B. secunda**
2. Leaf margins plane or revolute from the base up to about \( \frac{1}{3} \) the leaf length; distal leaf cells nearly quadrate, mostly \( 1.5-2:1 \), the cell walls straight..................................................... **B. andrieuxii**

**Braunia andrieuxii** Lor. On rocks and boulders.

**Braunia secunda** (Hooker) Bruch, Schimper, & Gumbel On rocks and boulders.

**Hedwigia**

**Hedwigia ciliata** (Hedwig) P. Beauvois On rocks and boulders in the mountains.
Family HYLOCOMIACEAE

Plants pleurocarpous; primary stems erect or procumbent, yellow to red; leaves shortly bi-costate or ecostate; laminal cells elongate to linear, smooth.

1 Secondary fronds in raised, stair-step, horizontal layers, each frond produced on an arching branch; paraphyllia dense ................................................................. Hylocomium

1 Plants not as above (but the stems may be erect); paraphyllia absent.......................... Pleurozium

Hylocomium

Hylocomium splendens (Hedwig) Schimper On soil, humus, rotten logs in the mountains.

Pleurozium

Plants robust and forming deep, loose, shiny greenish yellow mats; stems red, erect-ascending, pinnately branched; paraphyllia absent; shoots ± julaceous, Entodon-like. Leaves concave, somewhat wrinkled-licable when dry, broadly oblong, appearing to be recurved-apiculate because of the abruptly incurved upper margins; margins plane or reflexed proximally, incurved and serrulate distally; costa short and double; cells linear, smooth; alar and basal cells thick-walled, orange. Dioicous. Capsules inclined to horizontal, curved; setae elongate, reddish, smooth.

Pleurozium schreberi (Bridel) Mitten On forest floors in the mountains. Upright main shoots of Pleurozium mimic the upright secondary shoots of Climacium.

[Catr, Sand, Taos].
Family HYPNACEAE
Plants pleurocarpous; paraphyllia absent; leaves ecosiate or basally bi-costate, often plicate; laminal cells elongate to linear, smooth.
1 Median and distal leaf cells prorate (papillose because of projecting cell ends) ........ Taxiphyllum
1 Median and distal leaf cells smooth
2 Plants small and slender; leaves tiny, 0.1-0.5 mm long; rhizoids densely papillose ........ 
........................................................................................................................................... go to Platydictya (Amblystegiaceae)
2 Plants larger, slender to robust; leaves longer than 0.5 mm long; rhizoids smooth or papillose
4 Leaves falcate-secund
5 Leaves 2.5-5 mm long, very strongly falcate; leaves strongly plicate, which obscures the single costa extending into the acumen ................. go to Sanioni (Amblystegiaceae)
5 Leaves rarely longer than 2.5 mm, weakly to strongly falcate; leaves not or scarcely plicate, the costa small and double ........................................ Hypnum
4 Leaves straight
6 Branch tips curved upward or outward when dry, often with many leaves directed towards the side, erect when moist
7 Median leaf cells 9-16:1; quadrate alar cells 5-15 along the margin
8 Brood branchlets hidden among the leaves at the stem tips (usually detached by teasing the stem tips); leaves plicate; operculum long-rostrate ........................................ Platygyrium fuscoluteum
8 Brood branchlets absent; leaves not plicate; operculum short ........................................... Pylaia polyantha
7 Median leaf cells 4-8:1; quadrate alar cells 20-25 or more along the margin
10 Capsules inclined to horizontal and asymmetric; proximal leaf margins reflexed...
............................................................ Homomallium
10 Capsules erect to suberect and symmetric; proximal leaf margins plane to incurved ................................................................. Pylaia selwynii
6 Branch tips ± straight with the leaves directed forward
11 Shoots terete-folate ........................................................................................................ Hypnum
11 Shoots at least somewhat flattened, complanate-folate
12 Leaf margins serrulate nearly to the base
13 Alar cells not differentiated or a few quadrate cells sometimes present; pseudoparaphyllia lacking ............................................. Pseudotaxiphyllum
13 Alar cells present and distinctly differentiated with several to many cells; pseudoparaphyllia present .................................. Taxiphyllum
12 Leaf margins entire or serrulate only at the apex (Isopterygiopsis often with 1-2 serrulate cells at alar region)
14 Pseudoparaphylla present, filamentous; rhizoids smooth ........ Isopyerygium
14 Pseudoparaphylla absent; rhizoids papillose ................................ Isopitygium

Homomallium
1 Leaves 0.5-0.8 mm long, the apices shortly and broadly acuminate; branches with nearly all leaves neatly directed forward (not or only slightly homomallous) ............... H. adnatum
1 Leaves 0.8-1.5 mm long, the apices slenderly acuminate to subulate; branches with many leaves directed to the side, at least at the branch tips (homomallous), the branches appearing to be shaggy
2 Leaf apices subulate; distal laminar cell walls thin; setae reddish .................... H. incurvatum
2 Leaf apices not subulate; distal laminar cell walls thick; setae yellow-orange .... H. mexicanum
H. mexicanum (Hedwig) Broth. 1. On boulders, also at the bases of trees and on exposed roots. Sometime attributed to the state, but not definitely known from New Mexico.
H. incurvatum (Schrader ex Bridel) Loeske On rocks and boulders, calcareous substrates, rarely deciduous trees.

Homomallium mexicanum Cardot
a Leaves to 1.3 mm long, not very imbricate, ovate-lanceolate, the apices narrowly acuminate; margins denticulate distally; var. mexicanum On bark or soil at the bases of trees, also rocks.
2 Leaf apices subulate; distal laminar cell walls thin; setae reddish .................... H. incurvatum
2 Leaf apices not subulate; distal laminar cell walls thick; setae yellow-orange .... H. mexicanum
H. adnatum (Hedwig) Broth. On boulders, also at the bases of trees and on exposed roots. Sometime attributed to the state, but not definitely known from New Mexico.

Hypnum
1 Leaves 1.5-2.5 mm long; alar cells abruptly enlarged, thin-walled, hyaline, often inflated
2 Leaves often cross-wrinkled when dry; alar cells gradually differentiated, not particularly inflated.................................H. pratense
2 Leaves often longitudinally furrowed when dry; alar cells abruptly differentiated and inflated ........................................H. lindbergii

1 Leaves mostly less than 1.5 mm long; alar cells small and quadrate

2 Leaves often longitudinally furrowed when dry; alar cells abruptly differentiated and inflated. ........................................H. lindbergii

3 Leaf margin (at least one) strongly revolute almost its entire length; leaves strongly circinate-falcate

4 Stem leaf margins serrate distally ..................................................H. pullescens

5 Leaves not concave as below; leaf margins usually strongly serrulate from base to apex ........................................H. pullescens

6 Leaf cells 4-6:1; alar cells quadrate, green, all the same .........................H. vaucheri

6 Leaf cells 10-15:1; alar cells of two kinds, the upper quadrate and green, the lower ones larger, pale, and inflated ........................................H. cupressiforme

Hypnum cupressiforme Hedwig. On soil, rock, and trees.

Hypnum lindbergii Mitten [Calliergonella lindbergii (Mitten) Hedanä]. Wet to moist soil and humus, wet meadows, stream banks, springs, boggy ground.

Hypnum pullescens (Hedwig) P. Beauvois

Hypnum pratense Koch ex Spruce [Breidleria pratensis (Koch ex Spruce) Loeske]. Wet meadows, stream banks, boggy ground, high elevations.


Hypnum vaucheri Lesquereux On soil, rocks, ledges.

Isoterygiopsis

Isoterygiopsis pulchella (Hedwig) Iwatsuki [Isopterygium pulchellum (Hedwig) Jaeger, Plagiothecium pulchellum (Hedwig) Schimper]. Rocky banks, cliff faces and crevices, bases of trees, decaying wood, in the mountains.

Isopterygium

Isopterygium tenerum Mitten On soil, bases of trees, rotten logs.

Platydictya : see Amblystegiaceae

Platygyrium [see comments at Homomallium for comparisons with Homomallium and Pylaisia]

Platygyrium fuscoluteum Cardot On old logs, stumps, tree trunks, damp boulders, rock faces, and shaded banks.

Pseudotaxiphylum

Pseudotaxiphylum homomallifolium (Redfearn) Ireland [Isopterygium homomallifolium Redfearn]. On rocks and under ledges and overhangs.

Pylaisia [see comments at Homomallium for comparisons with Homomallium and Platygyrium]

1 Stem leaves 1.3-2 mm long; quadrate alar cells of stem leaves 5-15 along the margin.................................P. polyantha

1 Stem leaves 0.9-1.2 mm long; quadrate alar cells of stem leaves 20-25 along the margin.................................P. selwynii

Pylaisia polyantha (Hedwig) Schimper [Pylaisiella polyantha (Hedwig) Grout]. Mostly at the bases of trees, sometimes on rock.

Pylaisia selwynii Kindb At the bases of trees and on rock. In many plants, the growth form is distinctive, with horizontal main stems, and older yellowish branches held erect with the tips curved over.

Taxiphylum

1 Leaves rather remote, scarcely overlapping ...............................................T. taxirameum

1 Leaves closely imbricate and conspicuously overlapping ........................................T. deplanatum

Taxiphylum deplanatum (Bruch & Schimper ex Sullivant) Fleischer On soil and rock, among roots, rotten logs.

Taxiphylum taxirameum (Mitten) Fleischer On soil and rock.
Homomallium incurvatum

Homomallium mexicanum

Hypnum cupressiforme

Hypnum lindbergi
Hypnum revolutum

Hypnum vaucheri

Platygyrium fuscoluteum

Pylaisia polyantha
Pylaisia selwynii

Taxiphyllum deplanatum

**Family LESKEACEAE**

Plants pleurocarpous; primary stems procumbent, not tomentose; paraphyllia present or absent; leaves uni- or bi-costate; laminal cells quadrate to linear, papillose or smooth.

1 Leaves with hair-points
   2 Leaf margins revolute; stems ± smooth......................... go to Anomodon (Anomodontaceae)
   2 Leaf margins plane; stems densely papillose (C. pellucinerve) ......................... Claopodium

1 Leaves without hair-points
   3 Costa short, ½ or less the leaf length
      4 Cells minutely multi-papillose (requires oil immersion); leaf cells 2-3:1; plants light green
         or yellowish brown.................................................. Leptopterigynandrum
      4 Cells smooth or prorate (papillose at the ends); leaf cells 1-2:1; plants dark olive-green to
         yellow-green............................................................ Pseudoleskea tectorum
   3 Costa long, more than ½ the leaf length
      5 Cells smooth, not papillose nor prorate
         6 Leaves squarrose when wet........................................ Lindbergia
      6 Leaves erect to spreading when wet
         7 Mid-laminal cells elongate-linear, 3-8:1................................ Lescuraea
         7 Mid-laminal cells shorter, 1-3:1
            8 Leaf margins plane or recurved below
               9 Mid-leaf cells 2-3:1, with noticeably thickened walls; leaf axils rarely with
                  clustered propagules ........................................... Pseudoleskea rupestris
               9 Mid-leaf cells 1-2:1, firm-walled but not noticeably thickened; leaf axils of
                  secondary branch leaves commonly with clustered flagelliform propagules......
                  ................................................... Leskea
            8 Leaf margins revolute beyond mid-leaf
               10 Costa sinuous ................................................. Pseudoleskea arizonae
               10 Costa ± straight
                  11 Plants dull; basal cells 1-2:1; median cells thick-walled, 2-3:1; capsules
                     inclined.......................................................... Pseudoleskea radicosa
                  11 Plants shiny; basal cells 3-5:1; median cells thin-walled, 3-8:1; capsules
                     erect ......................................................... Lescuraea saxicola

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Norris 1 Costa longer
1 Costa short, Pseudoleskea
Shaded rocks and outcrops, sometimes bases of trees.

mineral soil.

1 Apical cells mostly 1
Pseudoleskea
1 Branches not julaceous; brood branches commonl
1 Branches julaceous; brood branches absent; leaf cells minutely or indistinctly papillose
Lindbergia

sometimes rock.

Leskeella
Lescuraea
Leptopterigynandrum

Haplocladium
1 Stem surface cells papillose; leaf blade cells multi-papillose; leaf apices drawn out into a hair point .......................................................... C. pellucinerve
1 Stem surface cells smooth, lacking papillae; leaf blade cells 1-papillose; leaf apices acuminate, but not drawn out into a hair point.......................................................... C. whippleanum

Claopodium
Claopodium pellucinerve (Mitten) Best On rocks or crevices.
Claopodium whippleanum (Sullivant) Renaud & Cardot Soil over rock. Known only from El Malpais National Monument.

Haplocladium
1 Stem leaves not plicate; cells prorate from projecting end walls.................. H. angustifolium
1 Stem leaves 2-plicate basally; cells papillose with a single papilla in the cell middle .......................
.................................................................................. H. microphyllum

Haplocladium angustifolium (Hampe & Mull. Hal.) Brotherus [Bryohaplocladium angustifolium
(Hampe & Müller Hal.) Watson & Iwatsuki]. On rock, wood, and humus.
Haplocladium microphyllum (Hedwig) Brotherus [Bryohaplocladium microphyllum (Hedwig)
Watson & Iwatsuki]. On soil, wood, rocks, and humus.

Leptopterigynandrum
Leptopterigynandrum austroalpinum Müller On rock and soil in crevices.

Lescuraea
Lescuraea saxicola (Schimper) Milde On boulders, rock outcrops, and associated soil.

Leskeella
Leskeella nervosa (Bridel) Loeske [Pseudoleskea nervosa (Bridel) Nyholm]. On bark and sometimes rock.

Lindbergia
1 Branches julaceous; brood branches absent; leaf cells minutely or indistinctly papillose........
.................................................................................. L. mexicana
1 Branches not julaceous; brood branches commonly clustered in the leaf axils; leaf cells distinctly and rather coarsely papillose.......................................................... L. brachyptera
Lindbergia brachyptera (Mitten) Kindberg On bark of maples and other deciduous trees.
Lindbergia mexicana (Bescherelle) Cardot On bark and rotten wood.

Pseudoleskea
1 Apical cells mostly 1-2:1; lumina of medial cells smaller than 8 µ diameter, the walls thin, the shape heterogenous .......................................................... P. incurvata
1 Apical cells mostly 2-3:1; lumina of medial cells larger than 10 µ diameter, the walls thin, the shape homogenous .......................................................... P. radicosa
Pseudoleskea incurvata (Hedwig) Loeske [Lescuraea incurvata (Hedwig) E. Lawton]. On rock and mineral soil.
Pseudoleskea radicosa (Mitten) Macoun & Kindberg [Lescuraea radicosa (Mitten) Moenkemeyer]. Shaded rocks and outcrops, sometimes bases of trees.
Pseudolesкеela
1 Costa short, at most reaching midleaf, often double ............................................... P. tectorum
1 Costa longer, strong, reaching at least to midleaf and mostly well beyond
2 Costa sinuous .................................................................................. P. arizonae
2 Costa straight .................................................................................. P. rupestris
Pseudoleskeella rupestris (Berggren) Hedenas & Soderstrom var. sibirica (Arnell) Lawton, Pseudoleskeella sibirica (Arnell) P. Wilson & Norris. Shaded calcareous rock. Very similar to Leskea nervosa (Bridel) Loeske, and perhaps better placed with that species.

Pseudoleskeella tectorum (Funck ex Bridel) Kindberg On calcareous rock.
Haplocladium angustifolium

Leptopterigynandrum austroalpinum

Lindbergia brachyptera
Pseudoleskea radicosa

Pseudoleskeella arizonae

Pseudoleskeella tectorum
Family MEESIACEAE
Plants acrocarpous; leaves uni-costate, distally dentate; limbidium absent; laminal cells isodiametric to elongate, smooth or papillose.

**Leptobryum**
*Leptobryum pyriforme* (Hedwig) Wilson A common weed of moist soil, especially greenhouses.

![Leptobryum pyriforme](image)

Family MIELICHHOFERIACEAE
Plants acrocarpous; ??

**Pohlia**
1 Plants with axillary gemmae or bulbils
   2 Gemmae in clusters of 2-8 per leaf axil, linear to oblong, yellow, pink, or green .......... *P. tundrae*
   2 Gemmae single in the leaf axil, bulbiform, red to blackish ............................................. *P. drummondii*
1 Plants lacking axillary gemmae or bulbils
   3 Plants dull when dry; distal leaf cells hexagonal to rhomboidal
      4 Neck of capsule as long as or longer than the urn; endostome segments narrowly or not all perforate, cilia absent ............................................. *P. elongata*
      4 Neck of capsule definitely shorter than the urn; endostome segments broadly perforate, cilia present and long
         5 Plants whitish; costa ending well before the apex; capsule hanging straight down, the neck less than 1/3 the urn length ................................................................. *P. wahlenbergii*
         5 Plants greenish; costa subpercurrent to shortly excurrent; capsule horizontal to drooping, the neck about ½ the urn length ................................................................. *P. nutans*
   3 Plants very shiny when dry; distal leaf cells linear-rhomboidal
      6 Neck of the capsule ½ or less the urn length ................................................................. *P. cruda*
      6 Neck of the capsule ½ to equaling the urn length
         7 Leaves 1.5-2.6 mm long; plants paroicous ................................................................. *P. longicollis*
         7 Leaves 0.8-1.6 mm long; plants dioicous ................................................................. *P. bolanderi*

**Pohlia bolanderi** (Sullivant) Brotherus High elevation soil and rock crevices.
**Pohlia cruda** (Hedwig) Lindberg On soil banks, streamsides, rock crevices.
**Pohlia drummondii** (Müller Hal.) Andrews Rich soils and stream banks.
**Pohlia elongata** Hedwig Rich soils, humus, bases of trees.
**Pohlia longicollis** (Hedwig) Lindberg Rich soils, stream banks.
**Pohlia nutans** (Hedwig) Lindberg On soil, logs, tree bases.
**Pohlia tundrae** A.J. Shaw Rich soils and stream banks.
Family MNIACEAE

Plants acrocarpous; stems without comal tufts of leaves, with a central strand; leaves unicosatate; margin uni- to multi-stratose, usually with a limbidium; laminal cells quadrat to rectangular, smooth.

1 Distal leaf cells mostly linear; leaves lacking a limbidium............go to Pohlia (Mielichhoferiaceae)
1 Distal leaf cells mostly oblong-hexagonal to isodiametric; leaves usually with a limbidium, though sometimes obscure

2 Leaves entire, the margins partly or entirely bi- or multi-stratose; stems red to brown or blackish, densely clothed with large, freely branched rhizoids......................Rhizommium
2 Leaves toothed to almost entire, the margins 1-2-stratose; stems reddish to green, naked or obscurely clothed with rhizoids

3 Marginal teeth single, not in pairs; stoloniferous stems present, green, sterile....................Plagiomnium
3 Marginal teeth in pairs (single or almost lacking in M. arizonicum or M. blytii);
   stoloniferous stems absent, erect stems green at the young tips and reddish below, fertile...

Mniun
1 Laminal cells elongate, 1.5-2.5:1, commonly radiating in diagonal rows from costa to margin, the walls pitted..........................................................M. arizonicum
1 Laminal cells quadrate-hexagonal 1-1.5:1, not in diagonal rows, the walls not pitted

2 Leaf margins entire or weakly toothed; limbidium of 1-2 rows..............................M. blytii
2 Leaf margins markedly toothed; limbidium of 2-4 rows

   3 Cell walls not or only slightly thickened at the corners, so the cells are angular-hexagonal;
      medial laminal cells 10-25 µm diameter ........................................M. thomsonii
   3 Cells walls obviously thickened at the corners, so the cells are rounded-quadrate; medial
      laminal cells greater than 25 µm......................................................M. marginatum

Mniun arizonicum Amann On dry to moist soil and humus in the mountains.
Mniun blytii Bruch & Schimper Wet soil along brooks and creeks.
Mniun marginatum (Dickson ex Withering) Bridel ex P. Beauvois On wet to damp soil, humus, and rotten wood.
Mniun thomsonii Schimper [Mniun orthorrhynchum of numerous authors]. On wet to damp soil.

Plagiomnium
1 Leaf bases distinctly and broadly decurrent (best seen with leaves still attached to the stem); margins strongly toothed (weakly so in P. medium), easily seen with a hand lens; cells not in rows
2 Leaf margins strongly toothed in the upper ½-¾; cell walls not pitted; setae single in the
   perichaetium.................................................................P. cuspidatum
2 Leaf margins strongly toothed nearly to the base; cells walls inconspicuously to noticeably
   pitted

   3 Marginal teeth strongly developed, of 1-4 cells; laminal cells 1.5-2:1; setae single............P. ciliare
   3 Marginal teeth weakly developed but definite, of mostly a single cell; laminal cells 1-1.5:1;
      setae 1-5 per perichaetium ......................................................P. medium

1 Leaf bases not or scarcely (and narrowly) decurrent; margins weakly toothed to nearly lacking;
   cells in rows or not
4 Sterile stems typically erect, but also ascending to curved-horizontal; leaf cells in diagonal
   rows, increasing in size towards the costa, the walls distinctly pitted; plants dioicous; setae 1-
   3 per perichaetium; capsule lid conical..................................................P. ellipticum
4 Sterile stems typically curved-horizontal and creeping; leaf cells not in rows, hardly
   increasing in size towards the costa, the walls scarcely pitted; plants synoicous; setae 1-5 per
   perichaetium; capsule lid rostrate..................................................P. rostratum

Plagiomnium ciliare (Müller Hal.) Koponen [Mniun affine Bland. ex Funck var. ciliare Müller Hal.].
On damp soil, humus, and wood.
Plagiomnium cuspidatum (Hedwig) Koponen [Mniun cuspidatum Hedwig]. On wet to damp soil, humus, rotting logs, and rocks.
Plagiomnium ellipticum (Bridel) Koponen [Mniun affine Bland. ex Funck var. rugicum (Laur.)
Bruch & Schimper, Mniun ellipticum Bridel]. On wet soil and humus.
Plagiomnium medium (Bruch & Schimper) Koponen [Mniun medium Koponen]. On wet rock, soil, and humus.

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**Plagiomnium rostratum** (Schrader) Koponen [Mnium rostratum Schrader]. On wet soil and humus.

**Rhizomnium**
1 Larger leaves 7-15 mm long; plants dioicus ...........................................

1 Larger leaves 4-7 mm long; plants dioicus or synoicus
  2 Distal cells conspicuously pitted; costa ending well below the apex, only rarely with a suggestion of a mucro; plants synoicus ..............................

2 Distal cells not or only slightly pitted; costa ending at or very near the apex, usually with a noticeable mucro; plants dioicus .................................................................

**Rhizomnium magnifolium** (Horik.) Koponen [Mnium punctatum Hedwig var. elatum Schimper]. On wet soil in the mountains, around springs and seeps.

**Rhizomnium pseudopunctatum** (Bruch & Schimper) Koponen On wet soil and humus.

**Rhizomnium punctatum** (Hedwig) T. Koponen On damp to wet soil, rock, and rotting wood, in shaded sites. On wet soil and decaying wood.
Family NECKERACEAE

Plagiomnium medium

Plants pleurocarpous, the shoots complanate; leaves ecostate to bi-costate; laminal cells much elongated, smooth; capsules immersed.

Rhizomnium punctatum

Neckera

1 Costa well-developed, extending beyond mid-leaf.......................... N. menziesii
1 Costa nearly absent, short and double, never extending even to mid-leaf.............. N. pennata

Neckera menziesii Drummond [Metaneckera menziesii (Drummond) Steere, Porotrichum neomexicanum (Cardot) Wagner]. On shaded rocks and tree trunks in the mountains.

Neckera pennata Hedwig var. pennata On shaded rocks in the mountains.
Neckeria pennata

Family ORTHOTRICHACEAE
Plants acrocarpous, usually cushion-forming; leaves uni-costate, usually lacking hair-points; laminal cells quadrate, papillose.

1 Distal leaf cells with (3)4-7 small, conic to clavate papillae; numerous gemmae often produced in the leaf axils, but not on the leaf surface; seta slender, long; capsule long-exserted; calyptra cucullate ................................................................. Zygodon

1 Distal leaf cells with 1-3(4) branched, conic or irregular papillae or smooth; gemmae, when present, produced on the leaf surface, and not in the leaf axils; seta stout, short; capsule emergent to shortly exserted; calyptra mitrate .............................................. Orthotrichum

Orthotrichum
1 Leaves ending in a hyaline awn or hair-point; plants on bark, rarely on rock........... O. diaphanum
1 Leaves awnless and without a hair-point; substrate various

2 Plants on bark

3 Leaf margins erect-incurved; leaves ovate or elliptic, concave with broadly obtuse or rounded apices; laminal brood-bodies abundant; calyptrae papillose, neither plicate nor hairy................................................................. O. obtusifolium

3 Leaf margins plane to revolute; leaves ± lanceolate or oblong, plane to keeled, with narrowly obtuse, acute, or acuminate apices; laminal brood bodies absent, few, or abundant; calyptrae smooth, rarely papillose, plicate, hairy or naked

4 Basal leaf cells elongate, ± thick-walled and nodose; stomata superficial...................

...................................................................................................................................... O. pycnophyllum

4 Basal leaf cells rectangular, thin-walled and not nodose; stomata immersed

5 Leaves with conspicuous, sharp-pointed, simple or forked papillae ............ O. alpestre
5 Leaves with low, simple papillae, sometimes absent .................................. O. pumilum

2 Plants on rock

6 Capsules exserted, the setae evident

7 Capsules long cylindrical, smooth; stomata superficial .................................... O. laevigatum
7 Capsules ovoid, usually 16-ribbed, visible at the base; stomata immersed..... O. anomalum

6 Capsules immersed to only emergent, the setae not visible

8 Basal leaf cells elongate, ± thick-walled and nodose; stomata superficial.... O. rupestræ
8 Basal leaf cells rectangular, thin-walled and not nodose; stomata immersed

9 Leaves with low papillae or papillae lacking; leaves 2-stratose in distal portion........

...................................................................................................................................... O. hallii

9 Leaves with conspicuous, simple or forked papillae; leaves 1-stratose

10 Leaves blunt or obtuse, incurved when dry; basal cells quadrate to short-rectangular; peristome single ................................................................. O. pellucidum
10 Leaves sharply acute, loosely twisted when dry; basal cells rectangular to long-rectangular; peristome double ................................................................. O. alpestre

Orthotrichum alpestre Hornschuch ex Bruch & Schimper. On rock, often calcareous, occasionally on bark.

Orthotrichum anomalum Hedwig. On rock.

Orthotrichum diaphanum Bridel. On bark, rarely on rock.

Orthotrichum hallii Sullivant & Lesquereux. On rock.

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**Orthotrichum laevigatum** Zetterstedt. On rock.
**Orthotrichum obtusifolium** Bridel. On bark.
**Orthotrichum pellucidum** Lindberg. On rock.
**Orthotrichum pumilum** Swartz. On bark.
**Orthotrichum pycnophyllum** Schimper. On bark.
**Orthotrichum rupestre** Schleicher ex Schwägrichen. On rock.

**Zygodon**

**Orthotrichum hallii**

**Orthotrichum pumilum**

**Orthotrichum rupestre**

**Family PLAGIOTHECIACEAE**

Plants pleurocarpous, the shoots complanate; stems with a central strand; paraphyllia absent; leaves shortly bi-costate, pointed to acuminate; laminal cells much elongated, smooth.  

**Plagiothecium**

1 Leaf decurrencies composed of many inflated, quadrate to spherical cells; leaf margins broadly recurved nearly to apices ................................................................. *P. denticulatum*

1 Leaf decurrencies composed of mostly rectangular cells; leaf margins plane or narrowly recurved ................................................................. *P. laetum*

*Plagiothecium denticulatum* (Hedwig) Schimper. On rotten logs, stumps, bases of trees, humus, sometimes soil or soil over rock.
Plagiothecium laetum Schimper. On rotten logs, stumps, bases of trees, soil, frequently on soil over rock.

Family POLYTRICHACEAE
Plants acrocarpous, the primary stems arising from a rhizome-like subterranean stem, with a central strand; leaves with or without sheathing bases, mostly uni-costate, with adaxial chlorophylllose lamellae.

1 Leaves undulate, elliptic, lacking a sheathing bases, the margins strongly toothed .................... Atrichum
2 Plants with capsules
   3 Calyptra sparsely hairy ........................................................................................................ Meiotrichum
   4 Urn sharply angled with mostly 4 (sometimes 2 or 6) ......................................................... Polytrichum

3 Calyptra densely hairy
   4 Urn cylindric, not angled ................................................................................................. Polytrichastrum

2 Plants without capsules
   5 Stems fastigiate, branched at the base ............................................................................... Meiotrichum
   6 Median cells of the sheath short-rectangular (to 5:1) to rhomboidal; leaf margins plane, not folded over the lamellae ......................................................... Polytrichastrum

1 Leaves not undulate, with an abruptly expanded sheath, the margins entire to toothed

1 Plants with capsules
   3 Calyptra sparsely hairy ........................................................................................................ Meiotrichum
   4 Urn cylindric, not angled ................................................................................................. Polytrichastrum

2 Plants without capsules
   5 Stems fastigiate, branched at the base ............................................................................... Meiotrichum
   6 Median cells of the sheath linear (to 20:1); leaf margins folded upwards over the lamellae (in ours) ................................................................. Polytrichum

Atrichum
Atrichum selwynii Austin On clay soil along roadcuts and creek banks. The teeth along the margins are often paired.

Meiotrichum

Polytrichastrum
1 Blade margins entire or only obscurely denticulate; leaf apex cucullate .......... P. sexangulare
2 Lamellae coarsely papillose; capsules terete, cylindric ........................................ P. alpinum

1 Blade margins evidently serrulate; leaf apex awn-tipped
   2 Lamellae coarsely papillose; capsules terete, cylindric ........................................ P. alpinum
   2 Lamellae not papillose; capsule 4- to 6-angles ......................................................... P. ohioense

Polytrichastrum alpinum (Hedwig) G.L. Smith var. alpinum [Pogonatum alpinum (Hedwig) P. Beauvois]. On soil, humus, and shaded siliceous rock outcrops and banks.

Polytrichastrum ohioense (Renauld & Cardot) G.L. Smith Soil and humus in the San Andres Mountains.

Polytrichastrum sexangulare (Bridel) G.L. Smith Damp, gravelly soil and rock, often near snow melt. The leaves are somewhat incurved, with a blunt, hooded tip, and the stems resemble tiny Agave plants.

Polytrichum
1 Margins of the blade plane, not infolded over the lamellae...species of Polytrichum not known from New Mexico
2 Margins of the blade infolded over the lamellae
   1 Hair-points of the leaves stout and ± reddish throughout, or absent .......... P. juniperinum
2 Hair-points of the leaves slender and hyaline, ± whitish throughout ....................... *P. piliferum*

*Polytrichum juniperinum* Hedwig  Mostly on soil and in shade, but also on rock and in full sun.

*Polytrichum piliferum* Hedwig  On rocky often acidic soil, usually in full sun.
Family POTTIACEAE

Plants acrocarpous, mostly on soil; stems not tomentose, with or without a central strand; leaves uni-costate, some with adaxial lamellae; laminal cells quadrate to elongate, often papillose or smooth.

1 Leaves with ± erect lamellae or filaments on the adaxial (upper) surface of the costa (excluding propagula or gemmae)
   2 Leaves with lamellae on the adaxial surface of the costa ........................................... Pterygoneurum
   2 Leaves with filaments on the adaxial surface of the costa
      3 Leaf margins broadly inrolled (and mostly obscuring the filaments) ...................... Aloina
      3 Leaf margins reflexed to revolute ............................................................... Crossidium

1 Leaves without lamellae or filaments on the adaxial surface of the costa
   4 Tiny, bud-like plants; capsules immersed and cleistocarpous (see also Stegonia, a tiny bud-like plant, but with exserted capsules)
      5 Leaf blades papillose; yellow in KOH (T. acaulon) ........................................ Tortula
      5 Leaf blades smooth; red in KOH ........................................................................ Acaulon
   4 Plants larger and not bud-like and/or capsules exserted and stegocarpous
      6 Leaves with a definite, whitish, golden, or reddish hair-point or awn at least ½ the length of the lamina
         7 Leaves mostly broadest below the middle and tapering toward the tip; yellow in KOH ......
            ........................................................................................................... Pseudocrossidium
         7 Leaves mostly broadest near the middle or above; red or yellow in KOH
            8 Large basal cells abruptly differentiated from the smaller distal cells, usually forming U-shaped basal windows of clear cells on both sides of the costa ............. Syntrichia
            8 Basal and distal cells not differentiated as above, and without windows as above ......
               ........................................................................................................ Tortula
      6 Leaves lacking a distinct hair-point, or with a very short awn less than ¼ the length of the lamina
         9 Small densely tufted mosses of moist, seepy travertine cliffs and seeps, the leaves often encrusted with lime
         10 Basal cells abruptly differentiated, bulging, thin-walled, giving a vivid contrast between the green laminal cells and the clear basal ones; basal leaf margins serrate-dentate by projecting ends of the cells just above the area of the enlarged basal cells........................................................................................................... Eucladium

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10 Basal cells gradually differentiated, thicker-walled and not bulging, lacking a vivid contrast as above; basal leaf margins serrate-dentate as above or entire
11 Leaf apices rounded to obtuse; leaf margins mostly plane .......... Gymnostomum
11 Leaf apices obtuse to acute; leaf margins, at least one, mostly revolute
12 Stem central strand absent; basal marginal and adjacent cells transparent and appearing empty; terminal distal cell at leaf apex pellucid and slightly enlarged ...................................................... Hymenostylium
12 Stem central strand present; basal marginal and adjacent cells opaque with cell contents; apical cell not as above .......................................................... Didymodon

9 Small to large mosses not of wet travertine cliffs or seeps
13 Leaves mostly broadest near the middle or above; costa with a Stereidi band only on the abaxial surface
14 Leaves large, 2-6 mm long, if slightly smaller then with basal hyaline windows of clear cells on both sides of the costa
15 Margins bordered with several rows of enlarged, thick-walled cells often tinged with orange, these conspicuous; papillae on the blade usually distant; blades reddish orange in KOH ........................................ Crumia
15 Margins not so bordered; papillae on the blade usually crowded; blades brick-red in KOH ................................................... Syntrichia
14 Leaves smaller, up to 2 mm long, lacking hyaline windows
16 Leaves coarsely toothed in the upper ½ .................................... Leptodontium
16 Leaves entire to minutely serrate
17 Papillae absent ................................................................. Chenia
17 Papillae present
17 Leaves red in KOH
18 Distal laminal margins not differentiated from the interior cells; papillae simple .................................................. Microbryum
18 Distal laminal margins differentiated into a distinctive border of nearly smooth cells, very different than the densely papillose interior cells; papillae simple or bifid ... Hennediella
17 Leaves yellow in KOH
19 Leaves broadly ovate, rounded, deeply concave, aggregated into a cabbage-like head; laminal cells not papillose; high elevations .......................................................... Stegonia
19 Leaves otherwise, papillose; habitat various
20 Sclerodermis present on the stem; leaves tending to be wider near the middle ........................................ Barbula
20 Sclerodermis absent on the stem; leaves tending to be wider above the middle ........................................ Tortula

13 Leaves mostly broadest near the base or at least below the middle, ± gradually narrowed upward; costa with Stereidi bands on both surfaces (often weak on the adaxial surface)
21 Leaf margins (at least one) recurved or revolute
22 Distal leaf margins tightly revolute, the inside of the rolled margin packed with bugling cells .............................................. Pseudocrossidium
22 Distal leaf margins merely recurved
23 Plants and leaves distinctly reddish proximally (but can be greenish distally); leaves with a few large, coarse teeth at the apex .................. Bryoerythrophyllum
23 Plants and leaves greenish, brown, or blackish, not reddish; leaf apices lacking large, coarse teeth
24 Basal marginal and adjacent few rows of cells transparent, clear, contrasting with the opaque inner cells toward the costa; central strand absent ........................................ Hymenostylium
24 Basal marginal and adjacent cells opaque, similar to the inner cells toward the costa; central strand present, usually distinct
25 Axillary hairs with a clear basal cell ............................... Barbula
25 Axillary hairs with a brownish basal cell ....................... Didymodon
21 Leaf margins plane or involute
26 Margins involute ......................................................... Weissia
26 Margins plane
27 Distal cells with a single massive, pillow-like papilla over the center of the lumen ............................................................... Tuerckheimia
27 Distal cells each with several smaller papillae
28 Leaf margins coarsely toothed in the upper half
29 Marginal cells differentiated from laminal cells in a narrow band of clear cells of about equal width running from insertion to about mid-leaf; perichaetia lateral ... Pleurochaete
29 Marginal cells differentiated running straight across the base or rising in a V- or U-shaped pattern
30 Leaves 1.5-2.5 mm long, loosely twisted when dry, the apices fragile and breaking off, 2-stratose in patches, red in KOH ................................................................. Rhoxophyllum
30 Leaves 3.5-5 mm long, incurved and tubulose when dry, the apices persistent, mostly 2-stratose except 2-3 rows along the margin, yellow in KOH ..................... Timmiella
28 Leaf margins entire to serrulate
31 Basal and more distal cells scarcely differentiated
32 Leaf apices rounded to obtuse; central strand present, but weak ................................................................. Gymnostomum
32 Leaf apices mostly acute; central strand absent ...................... ............................................................................. Hymenostylium
31 Hyaline basal cells markedly differentiated from the opaque cells upwards
33 Basal leaf margins serrate-dentate by projecting ends of cell walls; central strand absent ......................... Eucladium
33 Basal leaf margins entire; central strand present
34 Plants with a bluish cast when dry; perichaetia lateral .. ............................................................................. Molendoa
34 Plants not bluish; perichaetia terminal
35 Proximal cells differentiated straight across the leaf or as a U shape ........................... Trichostomum
35 Proximal cells differentiated as a V shape, or at least the laterally differentiated cells rising higher along the margin as a tapering border ..... Tortella

Acaulon
Acaulon triquetrum (Spruce) Müller Hal. Dry sandy, protected soil in the southern deserts.

Aloina
Aloina rigida (Hedwig) Limpricht var. rigida On rocky crevices and soil banks.

Barbula
1 Leaves rather flaccid when wet, distal laminal cells 11-15 µm, often lax, quadrate to rectangular, not or weakly papillose ................................................................. B. bolleana
1 Leaves usually firm when wet, distal laminal cells 7-12 µm, firm, quadrate, usually distinctly and strongly papillose
2 Abaxial costa surface cells prorate at both ends near apex, often with coarse mammillae in rows across the costa; leaf base widened but not sheathing ........................................ B. indica
2 Abaxial costa surface cells with crowded, simple or occasionally 2-fid, hollow or solid papillae or smooth, seldom distinctly prorate near apex; leaf base weakly sheathing
3 Costa percurrent or ending before the apex; leaf apex entire or apiculate by a smooth or weakly papillose conical cell ................................................................. B. convoluta
3 Costa short-excurrent as a mucro or if percurrent, then leaf acuminate .......... B. unguiculata

Barbula bolleana (Müller Hal.) Brotherus [Barbula ehrenbergii (Lorentz) Fleischer]. Wet rocks.
Barbula convoluta Hedwig var. convoluta On rock and soil.
Barbula indica (Hooker) Sprengel var. indica On rock and soil.
Barbula unguiculata Hedwig On soil and rock.

Bryoerythrophyllum
**Bryothrophium recurvirostrum** (Hedwig) Chen On soil and rock.

**Chenia**

**Chenia leptophylla** (Müller Hal.) Zander [**Tortula rhizophylla** (Sakurai) Iwatsuki & Saito]. On bare soil in disturbed open areas.

**Crossidium**

1 Filaments long and sometimes branched, commonly 5-10 cells long, the mass of filaments spreading over half or more the width of the leaf
2 Distal cells of the leaf very thick-walled, the lumen almost obliterated, giving the distal marginal area a bleached, whitish appearance; cells of the filaments thick-walled ..........................**C. squamiferum**
2 Distal cells of the leaf not excessively thick-walled, the lumen well-developed, the distal marginal area greenish-pellucid; cells of the filaments thin-walled ..........................**C. crassinervium**
1 Filaments short and rarely branched, generally 2-6 cells long, the mass of filaments scarcely exceeding the costal zone
3 Distal cells of leaf multi-papillose ..............................................................**C. seriatum**
3 Distal cells of leaf smooth or 1- or rarely 2-papilllose ................................**C. aberrans**

**Crossidium aberrans** Holzing & Bartram On soil and rocks.

**Crossidium crassinervium** (De Notaris) Juratzka var. *crassinervium* On soil and rocks.

**Crossidium seriatum** Crum & Steere Sandy soil and rocks.

**Crossidium squamiferum** (Viviani) Juratzka Sandy soil and rocks along washes of arid areas; known as yet only from Grant County.

**Crumia**

**Crumia latifolia** (Kindberg) Schofield Moist areas along streams.

**Didymodon**

1 Leaf apices caducous or very fragile
2 Leaf apices apically swollen as a propagulum ................................**D. anserinocapitatus**
2 Leaf apices not swollen, usually evenly narrowing ................................**D. rigidulus**
1 Leaf apices intact or only occasionally broken
3 Costa with elongate superficial adaxial cells
4 Leaves ligulate to ovate-lanceolate, apex often obtuse, costa often ending before the apex ........................................**D. tophaceus**
4 Leaves short- to long-lanceolate, apex always acute, costa subpercurrent to short-excurrent
5 Leaves when moist spreading to weakly recurved, usually lying flat, costa usually distinctly widened at base ..............................................................**D. fallax**
5 Leaves when moist strongly recurved and keeled, lying on their sides, costa little widened at base ........................................................................**D. ferrugineus**
3 Costa with quadrate or occasionally short-rectangular superficial adaxial cells, or, if elongate then the distal laminar cells 2-stratose
6 Leaves adaxially with a narrow medial channel about the width of the costa at least at leaf apex, the apex often apiculate by one or more conical cells; costa usually percurrent; margins usually recurved, often near the apex
7 Leaves short- to long-lanceolate or long-triangular, to 4 mm long; margins recurved near base or up to proximal 2/3 of leaf; propagula rare ................................**D. vinealis**
7 Leaves deltoid to short-lanceolate or ovate, to 1.5 or rarely to 2 mm; margins recurved or revolute to near apex; propagula sometimes present
8 Costal section showing adaxial epidermal cells thin-walled, remainder of costa thick-walled; costa blunt apically, wider at mid-leaf than below, with a bulging adaxial surface forming a long-elliptic 1-stratose pad of cells; guide cells in 2(-3) layers, leaf margins loosely revolute ........................................**D. nevadensis**
8 Costal section showing all cells about equally thickened; costa often with an apical conical cell or costa short-excurrent, gradually narrowing distally, the adaxial surface nearly flat and not forming a wide pad of cells (but costa occasionally thickened and bulging adaxially); guide cells usually in 1 layer, leaf margins narrowly to loosely recurved
9 Leaves ovate or ovate-lanceolate, 0.7-1 mm long, the base ovate or weakly differentiated, the apex cuculate or weakly concave; margins weakly recurved; costa percurrent or very weakly excurrent from an obtuse or acute apex in 1-3 cells ................................**D. brachyphyllus**

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9 Leaves deltoid to deltoid-lanceolate, 1-1.5(-2) mm, base squared, the apex straight or somewhat reflexed; margins strongly recurved to revolute; costa excurrent from an obtuse apex as a several-celled blunt mucro..............*D. tectorum*

6 Leaves adaxially very widely channeled medially or merely slightly concave across leaf, the apex seldom apiculate by a conical cell; costa percurrent or excurrent as a multicellular, stout mucro; margins plane to recurved below mid leaf

10 Axillary gemmae present

11 Propagula all multicellular; leaf apex acute .............................................*D. rigidulus*

[see lead 2, above]

11 Propagula mostly unicellular; leaf apex broadly obtuse ......................*D. revolutus*

10 Axillary gemmae absent

12 Distal lamina 1-stratose or occasionally 2-stratose in small patches ......*D. rigidulus*

12 Distal lamina 2-stratose totally or just along margins

13 Distal lamina entirely 2-stratose ...........................................................*D. rigidulus*

13 Distal lamina 2-stratose along margins

14 Leaves short-lanceolate, smooth to strongly papillose; marginal basal cells not or weakly differentiated from the medial cells; adaxial superficial cells of costa quadrate.............................................................*D. australasiae*

14 Leaves long-lanceolate, usually smooth or weakly papillose; marginal basal cells narrowly rectangular in 2-4 rows; adaxial superficial cells of costa usually elongate .............................................*D. umbrosus*

**Didymodon anserinocapitatus** (X.-j. Li) Zander Red sandstone cliffs near the Colorado border.

**Didymodon australasiae** (Greville & Hooker) Zander [Husnotiella torquescens (Cardot) Bartram, Trichostomopsis australasiae (Greville & Hooker) Robinson]. On soil, rock, sandstone ledges.

**Didymodon brachyphyllus** (Sullivant) Zander On soil, rock, roadsides, sandstone cliffs.

**Didymodon fallax** (Hedwig) Zander On soil and rocks, sanstone.

**Didymodon ferrugineus** (Schimper ex Beschereille) M.O. Hill [Barbula reflexa (Bridel) Bridel]. On soil, ledges, and rock outcrops.

**Didymodon nevadensis** Zander On soil and rock outcrops. Very similar to *Tortula atrovirens*, but that species has the costa thickened distally.

**Didymodon revolutus** (Cardot) Williams On cliffs and rock outcrops.

**Didymodon rigidulus** Hedwig On soil, cliffs, rock outcrops, sandstone boulders.

**Didymodon tectorum** (Müller Hal.) Saito On rocks and ledges.

**Didymodon tophaceus** (Bridel) Lisa On wet rocks and seepy cliffs.


**Didymodon vinealis** (Bridel) Zander var. *vinealis* On soil and rock outcrops and ledges.

**Eucladium**

**Eucladium verticillatum** (Bridel) Bruch & Schimper [Weissia verticillata (Bridel)]. Seepy or dripping rock faces and cliffs.

From P. Eckel (2007): “Assurances in the literature to the contrary, many other taxa also possess serrulate or denticulate leaf-shoulder margins, especially *Hymenostylium*, while *Eucladium* may rarely lack such serrulations.”

**Gymnostomum**

**Gymnostomum aenuginosum** Smith [Gymnostomum calcareum of NM reports]. Wet rocks and cliffs.

**Hennediella**

**Hennediella heimii** (Hedwig) Zander var. *heimii* [Desmatodon heimii (Hedweg) Mitten, Pottia heimii (Hedwig) Hampe]. On soil.

**Hymenostylium**

**Hymenostylium recurvirostrum** (Hedwig) Dixon var. *recurvirostrum* [Gymnostomum recurvirostrum Hedwig]. Wet or dripping bluffs, rock faces, cliffs, wet soil along streams.

**Leptodontium**

**Leptodontium flexifolium** (Withering) Hampe On soil and rocks, and sometimes old bark.

**Microbryum**

1 Leaves mostly less than 2:1, with a short yellow apiculus; spores smooth or tuberculate (seldom also weakly papillose), 22-30 μm ..................................................*M. starkeanum*

1 Leaves mostly more than 2:1, with a reddish apiculus; spores papillose or spiculose, 28-39 μm......*M. davallianum*
Microbryum davallianum (Smith) R.H. Zander var. conicum (Schwägrichen) R. H. Zander
[Pottia texana Wareham]. On dry soil.

Microbryum starkeanum (Hedwig) R.H. Zander
[Pottia arizonica Wareham var. mucronulata Wareham]. On bare soil.

Molendoa
Molendoa sendtneriana (Bruch & Schimper ) Limpricht [Anoectangium obtusifolium (Brotherus & Paris in Cardot) Grout]. On soil and rock.

Pleurochaeta
Pleurochaeta luteola (Bescherelle) Thériot Exposed soil over rock.

Pseudocrossidium
Plants in small cushions or turf, yellowish green to brown, often nearly hidden by soil. Stems 3-15(20) mm long, sparsely branched. Leaves appressed and usually spiraled when dry, spreading when moist, ovate to lanceolate, gradually tapering to the apex; margin entire or nearly so, tightly revolute, the edges reaching the costa distally; costa broad, prominent, excurrent as a mucro or short awn, concave or convex; median cells subquadrate, 1:1-2, densely papillose. Discous.

When dry, the tiny plants with spirally arranged and sharply pointed leaves are characteristic.

1 Leaves long-mucronate to long-awned...........................................P. crinitum

1 Leaves merely apiculate to short-mucronate

2 Plants coarse; leaves comparatively long, 1-1.5 mm, ligulate to oblong-lanceolate, the apex obtuse; costa concave adaxially, with (4)6 guide cells........................................P. replicatum

2 Plants delicate; leaves short, 0.7-1.2 mm, ovate to ovate-deltoid, the apex broadly acute; costa convex adaxially, with 2-3 guide cells...........................................P. obtusulum

Pseudocrossidium crinitum (Schultze) Zander [Pseudocrossidium aureum (Bartram) Zander]. Sandy soil, rocks and ledges where sand or silt accumulates, in arid regions.

[Cair, Dona, Eddy, Hard, Oter, Sier, Torr].

Pseudocrossidium obtusulum (Lindberg) Crum [Barbula obtusula Lindberg]. On soil, calcareous outcrops and ledges, in the southern desert areas.

[Dona].

Pseudocrossidium replicatum (Taylor) Zander [Barbula replicata Taylor]. On soil, boulders, ledges, in the desert and dry grassland regions.

[Cibo, Dona, Eddy, Grant, Guad, Oter, Quay, Sant].

Pterygoneurum
1 Capsule emergent to exserted; calyptra cucullate, often longer than the capsule..........P. ovatum

1 Capsule immersed to emergent; calyptra small, mitrulate, shorter than the capsule and splayed out on the sides.................................................................P. subsessile

Pterygoneurum ovatum (Hedwig) Dixon [Pterygoneurum caviolium (Ehrh.) Juratzka]. On desert soil.

Pterygoneurum subsessile (Bridel) Juratzka var. subsessile On desert soils and flats.

Rhexophyllum
Rhexophyllum subnigrum (Mitten) Thériot ex Hilpert Shaded rock faces and crevices.

Stegonia
Stegonia latifolia (Schwägrichen) Venturi ex Brotherus var. latifolia On soil, rocks, and bases of trees.

Syntrichia
1 Costa percurrent or short-excurren1 into a mucro or apicus

2 Lamina bi-stratose .................................................................S. chiosa

2 Lamina uni-stratose ...............................................................S. fragilis

1 Costa excurrent as an awn or hair point

3 Laminal cells colllenchymatous, with a single papilla on the abaxial surface..........S. papillosa

3 Laminal cells with evenly thickened walls, not collenchymatous, with multiple papillae on both surfaces

4 Leaf margins plane or slightly recurved at mid leaf

5 Costa smooth abaxially; awn smooth or with a few short teeth; on bark..........S. laevipila

5 Costa strongly papillose abaxially; awn serrulate; on soil and rock ..........S. bartramii

4 Leaf margins strongly revolute at least in proximal part of leaf

6 Leaf 2-stratose or thicker..........................................................S. caninervis

6 Leaf 1-stratose
7 Costa lacking hydroids but having a row of large-lumined cells abaxial to guide cells; stem lacking a central strand; leaves tapered to the apex from their widest point about one-third the way up from the base, without a constriction near mid leaf.
8 Distal cells with tall, bulging mammillae, as high as the thickness of the lamina, sometimes higher, also bearing 1-2 papillae. \( \text{S. papillosissima} \)
9 Leaf margins plane in the distal \( \frac{3}{4} \); hair point mostly red; distal cells 13-18 \( \mu \text{m} \). \( \text{S. norvegica} \)
7 Costa with hydroids; stem with a central strand; leaves constricted near mid leaf.
10 Awns short, to 0.5 mm, smooth or with a few short teeth. \( \text{S. sinensis} \)
10 Awns long, 0.5-3 mm, serratate.
11 Leaves 1-3 mm long, the margins revolute well above the middle; distal laminal cells 8-12 \( \mu \text{m} \). \( \text{S. montana} \)
11 Leaves 3-4 mm long, the margins revolute to about the middle; distal laminal cells 12-23 \( \mu \text{m} \). \( \text{S. obtusissima} \)

**Syntrichia bartramii** (Steere) Zander [Tortula bartramii Steere]. On dry rocks and soil.

**Syntrichia caninervis** Mitten [Tortula bistratosa Flowers, Tortula caninervis (Mitten) Brotherus]. On desert soils.

**Syntrichia chisoa** (Magill, Delgadillo, & Stark) Zander [Tortula chisoa Magill, Delgadillo, & Stark]. On desert soils and rocks.

**Syntrichia fragilis** (Taylor) Ochyra [Tortula fragilis Taylor]. On rocks and tree bark.

**Syntrichia laevisula** Bridel [Tortula pagorum (Milde) De Notaris]. On tree bark.

**Syntrichia montana** Nees [Tortula intermedia (Bridel) Berkeley, Tortula montana (Nees) Lindberg]. On soil and rock.


**Syntrichia obtusissima** (Müller Hal.) Zander [Tortula obtusissima (Müller Hal.) Mitten]. On soil and rock, rarely on trees.

**Syntrichia papillosa** (Wilson) Juratzka [Tortula papillosa Wilson]. On oak bark.

**Syntrichia papillosissima** (Coppey) Loeske [Tortula papillosissima (Coppey) Brotherus]. On soil and rock at upper elevations.

**Syntrichia ruralis** (Hedwig) Weber & Mohr [Tortula ruralis (Hedwig) Gaertner]. Widespread on soil and rock.

**Syntrichia sinensis** (Müller Hal.) Ochyra [Barbula sinensis Müller Hal.]. On vertical limestone rock.

**Timmia**

**Timmia anomala** (Bruch & Schimper) Limpricht On soil, rock, cliff, rock crevices.

**Tortella**

1 Stems almost absent to 1 cm long; leaf apex broadly acute to obtuse. \( \text{T. humilis} \)
1 Stems 1-6 cm long; leaf apex long-acuminate. \( \text{T. tortuosa} \)

**Tortella humilis** (Hedwig) Jennings On exposed rocks and soil, often near streams.

**Tortella tortuosa** (Hedwig) Limpricht On rocks, boulders, crevices, rotten wood.

**Tortula**

1 Capsules immersed within the leaves, lacking a dehiscent operculum and rupturing when mature (cleistocarpous). \( \text{T. acaulon} \)
1 Capsules exserted, dehiscent by an operculum.

2 Leaves strongly bordered by thicker walled cells, either just proximally or nearly throughout; cells smooth or very weakly papillose
3 Leaves bordered at least in the lower 2/3 of the blade, sometimes throughout; costa scarcely excurrent as a short apiculus; capsule leaning to curved-horizontal. \( \text{T. cernua} \)
3 Leaves bordered only at the base; costa excurrent as a short awn; capsule erect. \( \text{T. mucronifolia} \)

2 Leaves not so bordered, or only slightly so; cells smooth to papillose
4 Leaves awnless, apiculate, or short-mucronate
5 Costa with an adaxial pad of swollen cells at the distal region. \( \text{T. atrovirens} \)
5 Costa lacking an adaxial pad of swollen cells distally
6 Distal costa narrow, of 2-3 cells across the adaxial surface; spores 20-23 µm diameter

6 Distal costa broader, of 3-6 cells across the adaxial surface; spores 11-18 µm diameter

7 Distal laminal cells 15-18 µm wide.................................T. inermis
7 Distal laminal cells 10-13 µm wide.................................T. obtusifolia

4 Leaves, at least the distal, awned

8 Leaf cells smooth or nearly so

9 Leaf margins recurved at the base or somewhat higher; costa 3-5 cells across the adaxial surface ......................................................T. mucronifolia
9 Leaf margins plane; costa 2-3 cells across the adaxial surface...............T. nevadensis

8 Leaf cells papillose, at least adaxially

10 Operculum indehiscent, with the peristome attached to the inside....T. protobryoides
10 Operculum dehiscent

11 Distal laminal cells 15-20 µm wide; spores 13-23 µm wide, papillose

12 Cells of the distal margins not less papillose than the medial margins; spores 20-23 µm wide......................................................T. hoppeana
12 Cells of the distal margins less papillose than the medial margins; spores 13-18 µm wide......................................................T. guepinii

11 Distal laminal cells 8-13 µm wide; spores 6-12 µm wide, finely papillose to smooth

13 Peristome 120-200 µm long, or sometimes dehiscent with the operculum, the teeth of 16 segments ..............................................T. plinthobia
13 Peristome 800-1000 µm long, the teeth of 32 segments .................T. brevipes

Tortula acaulon (Withering) Zander [Phascum cuspidatum Hedwig]. On soil.
Tortula atrovirens (J.E. Smith) Lindberg [Desmatodon convolutus (Bridel) Grout]. Exposed soil and rock. Very similar to Didymodon nevadensis, but that species has the costa thickened medi ally.

Tortula brevipes (Lesquereux) Brotherus Calcareous soil.
Tortula cernua (Hübener) Lindberg [Desmatodon cernus (Hübener) Bruch & Schimper]. On calcareous soil.
Tortula guepinii (Bruch & Schimper) Brotherus [Desmatodon guepinii Bruch & Schimper]. On desert soil.
Tortula hoppeana (Schultz) Ochyra [Desmatodon latifolius (Hedwig) Bridel]. On soil.
Tortula inermis (Bridel) Montagne [Syntrichia inermis (Bridel) Bruch]. On soil and rock.
Tortula mucronifolia Schwägrichen On soil, rocks, and cliffs.
Tortula nevadensis (Cardot & Thériot) R.H. Zander [Pottia nevadensis Cardot & Thériot]. On soil.
Tortula obtusifolia (Schwägrichen) Mathieu [Desmatodon obtusifolius (Schwägrichen) Schimper]. On soil, rock, sandstone.
Tortula plinthobia (Sullivant & Lesquereux) Austin [Desmatodon plinthobius Sullivant & Lesquereux]. On rocks and outcrops.

Trichostomum

1 Leaves lanceolate, the base dilated; apex acute; basal cells commonly running up the margins in a U-shaped pattern ..............................................T. tenuirostre
1 Leaves ovate or elliptic to long-lanceolate; apex usually rounded or rounded-acute; basal cells evenly differentiated across the leaf base, not running up the margins in a U-shaped pattern
2 Leaves ovate to ovate-lanceolate or long-lanceolate, naviculate, the apex cucullate; distal margins erect; costa subpercurrent or percurrent, commonly ending in an apiculus....................T. crispulum
2 Leaves ovate to elliptical or very long-ligulate, flattened or keeled, the apex plane or grooved; distal margins plane; costa excurrent as a sharp mucro
3 Plants autoicous; mucro short-conic, of 3-4 cells ..................................T. planifolium
3 Plants dioicus; mucro short-conic to stout and narrowly tapering, of 3-6 or more cells .......

Trichostomum brachydontium Bruch On soil and rock.
Trichostomum crispolium Bruch On soil and rock.

**Trichostomum tenuirostre** (Hooker & Taylor) Lindberg. On soil, rocks, cliffs, overhangs.

**Tuerckheimia**

**Tuerckheimia svihlae** (Bartram) Zander. On rocks and bluffs.

**Weissia**

1. Mucro strong, of 6-10 cells; seta less than 1 mm long; operculum persistent ........... *W. phascopsis*
1. Mucro weak, of 1-5 cells; seta 3-8 mm long; operculum deciduous

   2. Hyaline basal portion of leaf little wider than the slightly narrower green upper portion..........

   3. Hyaline basal portion of leaf much wider than the much narrower green upper portion..........

**Weissia controversa** Hedwig [Weissia condensa auct., non (Voit) Lindberg]. Weedy and disturbed areas, on soil and rock.

**Weissia ligulifolia** (Bartram) Grout [Weissia andersoniana Zander]. On soil and in rock crevices.

**Weissia phascopsis** Zander [Astomum phascoides (Drummond) Grout]. On soil.
Barbula unguiculata

Bryoerythrophyllum recurvirostrum

Crossidium aberrans
Crossidium crassinervium

Crossidium squamiferum

Crumia latifolia
Didymodon australasia

Didymodon nevadensis

Didymodon revolutus
Didymodon rigidulus

Didymodon tophaceus

Didymodon vinealis

Gymnostomum aeruginosum
Hymenostylium recurvirostrum

Leptodontium flexifolium

Microbryum starkeanum

Molendoa sendtnerianum
Pleurochaete luteola

Pseudocrossidium crinitum
**Pterygoneurum ovatum**

**Pterygoneurum subsessile**

**Stegonia latifolia**

**Syntrichia bartramii**
Syntrichia caninervis

Syntrichia fragilis – costa papillate

costa epapillate  Syntrichia laevipila  gemma
Syntrichia norvegica

Syntrichia ruralis

Tortella tortuosa

Tortula acaulon
Trichostomum tenuirostrum

Weissia controversa
Weissia ligulifolia

Family PTYCHOMITRIACEAE
Plants acrocarpous; leaves lanceolate to linear, crisped when dry, uni-costate, pointed but lacking hair-points; laminal cells quadrate to rectangular, smooth.

Ptychomitrium
1 Leaf margins coarsely serrate distally ................................................................. P. serratum
1 Leaf margins entire distally ................................................................................ P. sinense

Ptychomitrium serratum Bruch & Schimper On calcareous rock.
Ptychomitrium sinense (Mitten) A. Jaeger [Ptychomitrium leibergii Best]. Mostly on rocks.

Family RHYTIDIACEAE
Plants pleurocarpous; paraphyllia absent, but pseudoparaphyllia present; leaves uni-costate, forked apically, pointed; margins revolute, uni-stratose; laminal cells linear, papillose.

Rhytidium
Rhytidium rugosum (Hedwig) Kindberg On rock or a thin layer of overlaying soil.
**Family Sphagnaceae**

Plants cladocarpous (sporophytes arising from the apex of apical branches), with branches in fascicles; stems with a central strand; leaves unistratose, ecostate, markedly heteromorphic, the stem leaves hyaline, the branch leaves composed of a network of chlorophyllose and hyaline cells; capsules ovoid.

**Sphagnum**

Plants soft and spongy, pale or whitish green (ours), or tinged with red, yellow, or brown. Stems mostly simple, bearing spirally disposed fascicles of 3-10 branches, the fascicles crowded toward the apex. Stem leaves distant, hyaline, erect distally, reflexed proximally. Branch leaves erect, imbricated; cells of branch leaves of two kinds: 1) large, vacuous, hyaline cells, bordered by 2) linear chlorophyllose cells.

1. Stem leaves fan-shaped, fringed on the margins from the apex nearly to the base; terminal bud large ........................................................................................................... S. fimbriatum

1. Stem leaves tongue-shaped, fringed only at the apex; terminal bud lacking or poorly developed...

**Sphagnum fimbriatum** Wilson. Plants pale green, forming thick cushions and mats in fens and meadows. Known only from a heavy mineral fen in the Jemez Mountains, with the following.

**Sphagnum girgensohnii** Russow. Known only from a heavy mineral fen in the Jemez Mountains, with the previous.
Family SPLACHNACEAE
Plants acrocarpous, often growing on dung or decaying animal matter; leaves uni-costate; margins flat, entire to dentate; laminal cells rectangular, smooth.

**Tayloria**
Plants tufted to scattered, pale to light green. Stems mostly erect, soft and tender; rhizoids reddish brown, papillose; with a large central strand. Leaves 1-3.5 mm long, usually lax to flaccid, broadly obovate to spatulate, narrowed at the base; apex broadly rounded to apiculate or slenderly acuminate; margins sharply serrate distally; costa percurrent; distal cells oblong to hexagonal, thin-walled; lower cells more elongated and wider. Autoicous. *Tayloria acuminata* Hornschuch. On damp to wet humus, rotten wood, and soil rich in organic matter, or rocks, in the northern mountains.

Family STEREOPHYLLACEAE
Plants pleurocarpous, the shoot complanate; leaves uni-costate, oblong-ovate, the margins plane; laminal cells rhombic, smooth or papillose.

**Stereophyllum**
Plants in loose patches or mats, light to yellowish green. Stems prostrate, sparingly branched, complanate. Leaves symmetric (dorsal) to asymmetric (lateral), 1.5-2 mm long, rounded to broadly acute; margin entire to serrulate distally, plane; costa stout below, extending to at least ⅓ the length of the leaf; median cells rhombic to oblong-rhombic, slightly mamilllose to strongly uni-papillose; juxtacostal cells longer; alar cells quadrate, numerous, 20-30 on the margin, extending to the costa at the base. *Stereophyllum radiculosum* (Hooker) Mitten. On wood, or occasionally rock.

Family TETRAPHIDACEAE
Plants acrocarpous; leaves mostly uni-costate, the margins entire; laminal cells quadrate to linear, smooth; calyptrae small, conic, peristome single, of four erect teeth.

**Tetraphis**
Plants greenish above, yellowish to brownish below. Stems 1-3 cm tall, mostly simple. Leaves ovate to ovate-lanceolate, 1.6 mm long, slightly contorted when dry; margins plane, entire; costa single, percurrent; cells uniform, rounded to hexagonal. *Tetraphis pellucida* Hedwig. Moist, decayed wood, stumps, and logs. Our only moss with four peristome teeth.
Tetraphis pellucida

Family THUIDIACEAE

Plants pleurocarpous, the branches often arcuate or homomallous; paraphyllia present; leaves heteromorphic, uni- or bi-costate; laminal cells hexagonal to rhomboidal, papillose.

1. Plants 1-pinnate ................................................................. Abietinella
1. Plants mostly 2- to 3-pinnate ........................................... Thuidium

Abietinella

Plants medium-sized, golden-brown. Stems mostly ascending to nearly erect, regularly 1-pinnate; branches stiff and brittle when dry; paraphyllia numerous, often branched, papillose. Stem leaves broadly ovate, acuminate, cordate at the base, plicate on either side; margins recurved proximally, plane to revolute distally, papillose-serrate distally, sometimes with a few short paraphyllia at the basal angles; costa percurrent; medial cells thick-walled, mostly oval to oblong-rhomboidal, but irregular in shape and size, with a single tall papilla over the lumen on both surfaces; basal cells longer and slightly porose. Branch leaves smaller, not cordate; apical cells with 1-3 papillae. Dioicous.

Abietinella abietina (Hedwig) Fleischer [Thuidium abietinum (Hedwig) Schimper]. On dry rocks and sandy soil, in shady places in the mountains, often at the bases of rock faces.

Thuidium

Stems prostrate to ascending, regularly 2- to 3-pinnate; paraphyllia numerous, branched, papillose. Stem leaves ovate, acuminate, ± plicate at the base; margin usually revolute to the base of the acumen, papillose-serrulate proximally, serrulate-prorate distally; costa percurrent; cells mostly uniform, rounded to oblong-hexagonal, thick-walled, mostly with a single papilla on the back; secondary branch leaves much smaller than the stem leaves, concave, ovate, acute, the margins erect, ending in a truncate multi-papillose cell, the costa shorter and weaker. Dioicous. Capsule inclined to horizontal, asymmetric.

1. Stem leaves merely acute, not reflexed when dry; perichaetial leaves ciliate ........ T. delicatulum
1. Stem leaf apex extending by 2-8 hyaline cells in a single row, reflexed when dry; perichaetial leaves not ciliate or only rarely so ......................................................... T. assimile

Thuidium assimile (Mittel) A. Jaeger [Thuidium delicatulum (Hedwig) Schimper var. radicans (Kindberg) Crum et al., Thuidium philibertii Limpricht]. On soil, humus, rocks, and logs in wet places. May reasonably be considered a variety of the preceding.

Thuidium delicatulum (Hedwig) Bruch & Schimper. On soil, humus, rocks, logs, and stumps.
Family TIMMIACEAE

Plants acrocarpous, on soil; stems tomentose below; leaves crisped to curling when dry, sheathing, uni-costate, pointed; laminal cells quadrate to rectangular, bulging-mammillose (ours).

**Timmia**

Stems with a large central strand. Leaves mostly linear-lanceolate, the base abruptly dilated and clasping the stem; margins serrate in the upper ⅔-⅓, entire to serrulate below; costa strong, percurrent or ending a few cells below the apex, cross-section with a single row of guide cells and both dorsal and ventral stereid bands; distal cells mostly quadrate to hexagonal, some shortly rectangular, usually bulging-mammillose on the ventral side and smooth to papillose on the dorsal side; basal cells abruptly elongated, thin-walled, hyaline or colored.

1 Leaf sheaths bright, clear orange (appearing red when still on the stem); plants dioecious; capsules rare ................................................................. **T. austriaca**

1 Leaf sheaths pale, uncolored or pale; plants monoecious; capsules common......... **T. megapolitana**

**Timmia austriaca** Hedwig  On soil in rock crevices and under rock overhangs, tree roots, sometimes on exposed wet stream banks.

**Timmia megapolitana** Hedwig var. *bavarica* (Hessler) Bridel [*Timmia bavarica* Hessler]. On soil in rock crevices and under rock overhangs, on roots of trees and similar shady places.
Preliminary List of the Liverworts of New Mexico

Family AYTONIACEAE

Asterella

Asterella elegans (Gotts.) del Ros.
Asterella gracilis (Web.) Underw.
Asterella palmeri (Austin) Underw.

Mannia

Mannia californica (Gotts. ex Underw.) Wheeler

Mannia fragrans (Balb.) Frye & Clark

Mannia paradoxa Schuster
Mannia pilosa (Hornem.) Frye & Clark

Plagiochasma

Plagiochasma rupestre (Forst) Steph.
Plagiochasma wrightii Sull.

Reboulia

Reboulia hemispherica (L.) Raddi

Blasia

Blasia pusilla L.

Blepherostoma

Blepherostoma trichophyllum (L.) Dumort.

Cephalozia

Cephalozia bicuspida (L.) Dumort.

Cephalozia lunulifolia (Dumort.) Dumort.

Cephalozia pleniceps (Aust.) Lindb.

Odontoschisma

Odontoschisma denuudatum (Mart.) Dumort.

Odontoschisma prostratum (Sw.) Trevis

Cephalozia

Cephalozia divaricata (Sm.) Schiffn.
Cephaloziella hampeana (Nees) Schniff.
Cephaloziella rubella (Nees) Warnst.

Family CLEVERACEAE

Athalamia

Athalamia hyalina (Sommerfelt) Hattori

Family CONOCEPHALACEAE

Conocephalum

Conocephalum salebrosum Szweyk., Buczk., Odrz.

Family FOSSOMBRONIACEAE

Fossombronia

Fossombronia sp.

Family GEOCALYACEAE

Chiloscyphus

Chiloscyphus pallescens (Ehrh. ex Hoffm.) Dumort.
**Chiloscyphus polyanthos** (L.) Corda

**Chiloscyphus rivularis** (Schrad.)Loeske

**Lophocolea**

*Lophocolea minor* Nees

**Frullania**

*Frullania brittoniae* A.Evans
*Frullania eboracensis* Gottsche
*Frullania inflata* Gottsche

*Frullania riparia* Hampe & Lehm.
Frullania pluricarinata Gottsche
d
Family JUNGERMANNIACEAE

Barbilophozia

Barbilophozia barbata (Schmid. ex Schreb.) Loeske

Barbilophozia floerki (F.Weber&D.Mohr) Loeske
Barbilophozia hatcheri (A.Evans) Loeske

Barbilophozia lycopodioides (Wallr.) Loeske

Gymnocolea

Gymnocolea inflata (Huds.) Dumort.
Jamesoniella

Jamesoniella autumnalis (DC.) Steph.

Jungermannia

Jungermannia atrovirens Dumort. *
Jungermannia confertissima Nees
Jungermannia exsertifolia Steph. subsp. cordifolia (Dumort.) Vana

Jungermannia hyalina Lyell
Jungermannia leiantha Grolle

Jungermannia pumila With.
Jungermannia sphaerocarpa Hook

Lophozia

Lophozia collaris (Nees) Dumort.
Lophozia incisa (Schrad.) Dumort.
Lophozia obtusa (Lindh.) A.Evans *
Lophozia ventricosa (Dicks.) Dumort.

Lophozia wenzelii (Nees) Steph.

Family LEPIDOZIACEAE

Lepidozia

Lepidozia reptans (L.) Dumort.

Family MARCHANTIACEAE

Dumotiera

Dumotiera hirsuta (Sw.) Nees

Marchantia

Marchantia polymorpha L.

subsp. polymorpha

subsp. montivagans

Family METZGERIACEAE

Apometzgeria

Apometzgeria pubescens (Shrank) Kuwah.
Metzgeria

*Metzgeria conjugata* Lindb.

Family OXYMITRACEAE

Oxymitra

*Oxymitra paleacea* Bisch.

Family PELLIACEAE

Pellia

*Pellia endeviiifolia* (Dicks.) Dumort.

Family PLAGIOCHILACEAE

Plagiochila

*Plagiochila asplenioides ssp. porelloides* (Torr.ex Nees) Schust.

Family PORRELACEAE

Porella

*Porella cordaeana* (Hueb.) Moore
*Porella pinnata* L.
*Porella platyphylla* (L.) Pfeiff.

Family RADULACEAE

Radula

*Radula bolanderi* Gottsche
Radula complanata (L.) Dumort.

Family RICCIACEAE

Riccia

Riccia albida Sull. ex Austin
Riccia albolimbata S. Arn.

Riccia atromarginata Levier

Riccia austini Steph.
Riccia beyrichiana Hampe ex. Lehm. & Lindenb.
Riccia campbelliana M.Howe
Riccia cavernosa Hoffm.
Riccia flutans L.
Riccia frostii Austin
Riccia hirta (Austin) Underw.
Riccia lamellosa Raddi
Riccia membranacea Gotts.&Lindb.
Riccia sorocarpa Bisch.

Family SCAPANIACEAE

Scapania

Scapania apiculata Spruce
Scapania curta (Mart.) Dumort.
Scapania cuspiduligera (Nees) Muell.Frib.

Scapania irrigua (Nees) Nees
Scapania mucronata Buch.

Scapania subalpina (Nees) Dumort
Scapania undulata (L.) Dumort.

Family TARGIONIACEAE

Targionia

Targionia hypophylla L.

Notes
The nomenclature reference source for this list is the United States Department of Agriculture (USDA) website (plants.usda.gov). The exception is Oxymitra paleacea Bisch., which is not recognized as by USDA, but is described in
1 May now be known as Asterella echinella (Gottsche)Underw.
2 Conocephalum conicum L. and Conocephalum salebrosum Szweyk,Buczk.,Odrz. are cryptic species that can not be separated by morphologic criteria but require molecular methods. C. conicum is found only in Europe while C. salebrosum occurs in North America
3 These species were only identified in very early reports, which listed the area as “Piedernales”, or “west of the Chiricahus”, neither of which may be in New Mexico.
4 This species was identified only by molecular methods
5 According to Hong, this is the only subspecies that occurs in NM
6 Porella platyphylla (L.) Pfeiff. and Porella platyphyloidea (Schwein.) Lindb. appear to be examples of so-called “cryptic” species, that cannot be differentiated solely on the basis of morphologic characteristics but require molecular studies for species identification. Both these species are being included under P. platyphylla.
*Unconfirmed
APPENDIX I: Distinguishing Features of Mosses

Leaves when dry curly, coiled, or crisped

Leaves whitish

Leaves with obvious awns or hair points

Leaves sickle-shaped

Leaves wrinkled-undulate

Shoots flattened

Shoots 2- to 3-times pinnate

Plants with visible gemmae or brood branchlets

Grimmia – Orthotrichum – Andreaea
APPENDIX II: Glossary of Terms
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