

16. PTYCHOMITRIACEAE Schimper

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Plants small to robust, tufted or gregarious or cespitose, yellowish green to blackish. **Stems** erect or repent, simple or forked; central strand present; rhizoids reddish brown, inconspicuous; axillary hairs several per axil, with 2–3 short proximal cells and 5–7 long distal cells. **Leaves** erect to crispate or circinate when dry, ascending when wet, linear to oblong-lanceolate; margins entire to coarsely serrate, thickened distally; costa single, strong; medial cells isodiametric, in longitudinal files, 1-stratose, or 2-stratose in patches, smooth or slightly papillose. **Specialized asexual reproduction** rare, by axillary 1-seriate or branched gemmae. **Sexual condition** autoicous. **Perigonia** gemmiform, axillary on short naked stalks. **Perichaetia** terminal but quickly overtopped by innovations; leaves few, short. **Seta** single or several from a perichaetium, smooth, straight or flexuous. **Capsule** erect, exserted, brown, ovoid to cylindrical, smooth or wrinkled when dry; stomata scarce, proximal on capsule, phaneropore; annulus revoluble; operculum slenderly rostrate; peristome single, teeth 16, short and broad to long and slender, smooth or densely papillose, mostly irregularly divided into 2–3 slender segments beyond the base. **Calyptra** mostly mitrate, lobed proximally, often deeply so, naked, smooth or plicate. **Spores** spheric.

Genera 3, species ca. 80 (2 genera, 6 species in the flora): nearly worldwide, mostly in temperate regions.

The acrocarpous habit, thickened and often serrate leaf margins, smooth or nearly so leaf cells, single peristome, and mitrate, basally lobed, and sometimes plicate calyptra make Ptychomitriaceae recognizable. The family has been included in Grimmiaceae by some authors, e.g., S. P. Churchill (1981), E. Lawton (1971), and A. Noguchi and Z. Iwatsuki (1987+, part 2), but it is recognized as a distinct haplolepideous family by, e.g., H. A. Crum and L. E. Anderson (1981) and D. H. Vitt (1982).

1. Plants delicate, very small; leaves linear above base, entire, commonly circinate when dry; seta flexuous; calyptra smooth 1. *Campylostelium*, p. 307
1. Plants coarse, small to robust; leaves acuminate above base, entire to serrulate or serrate, sometimes crispate but not circinate; seta straight; calyptra plicate 2. *Ptychomitrium*, p. 307

1. **CAMPYLOSTELIUM** Bruch & Schimper, Bryol. Europ. 2: 25. 1846 • [Greek *kampylos*, bent, and *stele*, pillar, alluding to curved seta]

Plants small, gregarious or caespitose, yellowish green. **Stems** erect. **Leaves** loosely crispate to circinate when dry, linear from a slightly broader base; medial cells smooth; margins entire, thickened distally. **Specialized asexual reproduction** absent. **Seta** curved when wet, flexuous when dry. **Capsule** ovoid-cylindric, smooth to indistinctly wrinkled or ribbed when dry; peristome teeth slender, single or variously perforate or divided, densely papillose or spiculose, often nodose. **Calyptra** mitrate, smooth, not plicate, lobed proximally. **Spores** smooth.

Species 2 (1 in the flora): North America, Europe, Asia, Africa.

1. **Campylostelium saxicola** (F. Weber & D. Mohr) Bruch & Schimper, Bryol. Europ. 2: 27. 1846 [F]



Dicranum saxicola F. Weber & D. Mohr, Neues Bot. Taschenb. Anfänger Wiss. Apothekerkunst 18: 167, 466. 1807

Plants glossy. **Leaves** 2–3 mm, often circinately curled when dry, margins entire, erect; apices acute, subcucullate. **Seta** 5–7 mm, twisted below the capsule and

often flexuous when dry, often recurved when wet. **Capsule** 1–1.2 mm, smooth or slightly wrinkled when dry; operculum red proximally, 0.5–0.7 mm; peristome

teeth red. **Calyptra** 0.7 mm, mostly shallowly lobed proximally. **Spores** 8–10 µm.

Capsules mature Oct.–May. Forests or openings on acidic sandstone boulders and cliffs, and sandstone rock shelters; moderate elevations (400–1300 m); P.E.I., Que.; Ala., Ark., D.C., Ind., Ky., Mass., N.H., N.J., N.Y., N.C., Ohio, S.C., Tenn., Va., Wash.; Europe.

Campylostelium saxicola is a tiny moss with glossy, crisped, or sometimes circinate leaves; it grows on shaded boulders in forests over most of its range but in rock shelters in the southern portion. *Campylostelium saxicola* is wide-spread in the flora area but infrequently collected due to its inconspicuous nature. Its small delicate stature, smooth calyptra, and usually flexuous-curved seta distinguish it from *Ptychomitrium*.

2. **PTYCHOMITRIUM** Fürnrohr, Flora 12(Ergänzungsbl.): 19. 1829, name conserved • [Greek *ptyx*, fold, and *mitra*, turban, alluding to plicate calyptra]

Plants small to robust, tufted or caespitose, dark green to blackish. **Stems** erect or repent. **Leaves** erect to crispate when dry, margins entire to serrulate or serrate; medial cells smooth or slightly papillose. **Specialized asexual reproduction** rare, by 1-seriate gemmae on branched axillary filaments. **Seta** straight. **Capsule** ovoid to cylindric, symmetric or slightly curved, smooth to wrinkled or ribbed when dry. **Calyptra** mitrate, more or less plicate, lobed proximally. **Spores** smooth to papillose.

Species 40–50 (5 in the flora): nearly worldwide, mostly in temperate regions.

SELECTED REFERENCE Cao, T. and D. H. Vitt. 1994. North American–East Asian similarities in the genus *Ptychomitrium* (Bryopsida). *Bryologist* 97: 34–41.

1. Leaves coarsely serrate distally.
 2. Leaves slenderly long-acuminate, 4–6 mm; basal leaf margins broadly recurved on one or both sides; calyptra deeply lobed proximally, lobes half length of calyptra 1. *Ptychomitrium gardneri*
 2. Leaves broadly acuminate, 3–4 mm; basal leaf margins plane and erect or irregularly narrowly recurved on one side proximally; calyptra shallowly lobed proximally, lobes less than 1/2 length of calyptra 2. *Ptychomitrium serratum*
1. Leaves entire or obscurely irregularly serrulate distally.
 3. Plants dull, mostly corticolous; leaves straight or slightly contorted but not crispate when dry, margins mostly obscurely serrulate distally 5. *Ptychomitrium drummondii*
 3. Plants glossy, mostly on rock; leaves crispate when dry, margins entire.

[4. Shifted to left margin.—Ed.]

4. Longest leaves mostly 2.5–4 mm 3. *Ptychomitrium sinense*
 4. Longest leaves mostly 2 mm 4. *Ptychomitrium incurvum*

1. *Ptychomitrium gardneri* Lesquereux, Mem. Calif. Acad. Sci. 1: 16. 1868 [E]



Plants robust, tufted, glossy, green to dark green. Stems erect or repent, to 5 cm. Leaves crispate-contorted when dry, narrowly acuminate, 4–6 mm; margins coarsely serrate distally, recurved on one or both sides proximally; apex plane or with erect margins but not cucullate. Specialized

asexual reproduction absent. Seta 1–2(–3) per perichaetium, 4–10 mm. Capsule cylindric, 2.5 mm, smooth to weakly striate-ribbed when dry; peristome teeth divided into filiform segments, densely papillose. Calyptra lobes $\frac{1}{2}$ or more length of calyptra.

Capsules mature Mar–Sep. Limestone, basalt, and other rocks, and concrete, rarely soil, logs, and charred wood, open sites, especially along rivers; low to moderate elevations (0–1400 m); B.C.; Calif., Idaho, Mont., Oreg., Wash.; Asia.

Ptychomitrium gardneri are robust glossy plants easy to recognize by their green to dark green color, serrate, acuminate leaves, and narrow lobes of the deeply divided calyptra. The lobes of dry mature calyptrae often spread outward like the spokes of a wheel. The leaves are much longer and more narrowly acuminate than those of the somewhat similar *P. serratum*; the ranges of the latter and of *P. gardneri* do not overlap.

2. *Ptychomitrium serratum* Bruch & Schimper, Bryol. Europ. 3: 82. 1837



Brachysteleum serratum (Bruch & Schimper) Müller Hal.

Plants medium-sized, tufted or cespitose, glossy, dark green. Stems erect or repent, to 1.5 cm. Leaves crispate when dry, broadly acute to acuminate, 3–4 mm; margins coarsely serrate distally, erect or irregularly recurved

proximally; apex plane or with erect margins but not cucullate. Specialized asexual reproduction absent. Seta 1(–4) per perichaetium, 3–4 mm. Capsule cylindric, 2–2.4 mm, smooth to slightly or prominently wrinkled or ribbed when dry; peristome teeth divided into filiform segments, densely papillose. Calyptra lobes less than $\frac{1}{2}$ length of calyptra.

Capsules mature Mar–Apr, Dec. Calcareous rock and concrete in forests; low to high elevations (0–2200 m); La., S.C., Tex.; Mexico; West Indies (Dominican Republic).

Ptychomitrium serratum grows in dark conspicuous tufts or cushions on basic rocks and concrete. Its habitat, size, prominently serrate leaf margins, and plane leaf tips make it easy to recognize. It is somewhat similar to *P. gardneri* but plants of the latter are much larger; the two species do not co-occur. This moss has been collected repeatedly in Texas, mostly in Culberson Co., in the Guadalupe Mountains, especially in McKittrick Canyon. It has also been found in central and southern Louisiana, at one site in South Carolina, and at a few sites in central and eastern Texas. Most of the specimens from Louisiana, South Carolina, and eastern Texas were taken from man-made calcareous substrates (concrete), but one colony from Louisiana grew on an old asphalt shingle roof.

3. *Ptychomitrium sinense* (Mitten) A. Jaeger, Ber. Thätigk. St. Gallischen Naturwiss. Ges. 1872–1873: 104. 1874



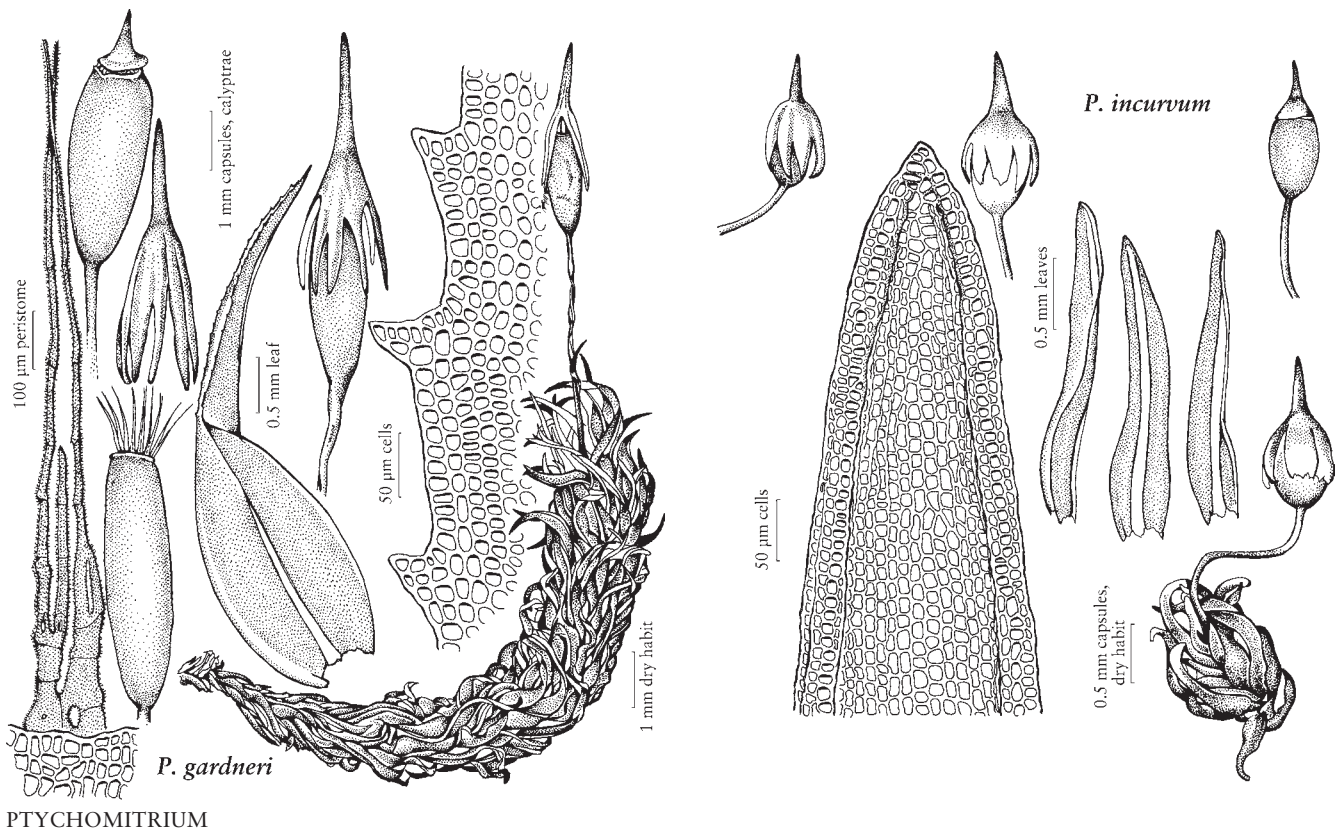
Glyphomitrium sinense Mitten, J. Linn. Soc., Bot. 8: 49. 1865;
Ptychomitrium leibergii Best

Plants medium size, cespitose, glossy, yellowish green. Stems erect, to 1 cm. Leaves crispate-curved when dry, broadly acuminate, mostly 2.5–4 mm; margins entire distally, plane proximally;

apex cucullate to subcucullate. Specialized asexual reproduction absent. Seta 1 per perichaetium, 3–4 mm. Capsule ovoid, 1.5 mm, irregularly wrinkled when dry; peristome teeth divided into triangular segments, smooth. Calyptra lobes half or more length of calyptra.

Capsules mature Jan–Jun. Basic and acidic rocks, occasionally soil or wood, forests; low to high elevations (100–2000 m); Ariz., Ark., Mo., N.Mex., Okla., Tex.; Mexico; Asia.

Plants of *Ptychomitrium sinense* are dark green and glossy; the leaves are tightly crispate when dry with the tips often circinate. The glossy pale or often brownish costa is very conspicuous in dry plants and is especially characteristic for this moss. When moist the leaf tips tend to be involute-cucullate and often falcate or somewhat uncinat.



PTYCHOMITRIUM

4. *Ptychomitrium incurvum* (Schwägrichen) Spruce,
Ann. Mag. Nat. Hist., ser. 2, 3: 487. 1849 [F]



Weissia incurva Schwägrichen, Sp.
Musc. Frond. Suppl. 2(1,1): 51. 116.
1823

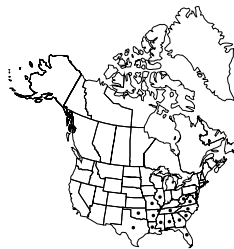
Plants small, cespitose, glossy, dark green. Stems erect, to 0.5 cm. Leaves crispate when dry, oblong-lanceolate, 2 mm; margins entire distally, erect proximally; apex cucullate to subcucullate.

Specialized asexual reproduction rare, short-uniseriate or branched gemmae, several cells long, on branched axillary filaments. Seta 1 per perichaetium, 2–3 mm. Capsule ovoid, 0.75–1 mm, smooth or wrinkled when dry; peristome teeth perforate but mostly not divided, densely papillose. Calyptra lobes about one third length of calyptra.

Capsules mature Sep–Jun. Acidic and calcareous rocks, soil, very rarely tree bark, open forests; low to moderate elevations (0–1400 m); Ala., Ark., Conn., Del., D.C., Fla., Ga., Ill., Ind., Kans., Ky., La., Md., Mich., Miss., Mo., N.J., N.Y., N.C., Ohio, Okla., Pa., S.C., Tenn., Tex., Va., W.Va.; South America (Ecuador); Europe.

The small dark green plants of *Ptychomitrium incurvum* are unmistakable growing on rock, with their glossy leaves tightly crispate when dry. The leaves are shorter than in *P. sinense* and are straight when wet, not somewhat falcate at the tips as is common in *P. sinense*. Sporophytes are very common in this moss and the old sporophytes persist for a long time. Sterile colonies of *P. incurvum* can be very reminiscent of *Weissia controversa*, but *Ptychomitrium* is more glossy; its leaves have smooth cells and without the strongly involute margins of *Weissia*.

5. *Ptychomitrium drummondii* (Wilson) Sullivant in
A. Gray, Manual ed. 2, 636. 1856 [E]



Grimmia drummondii Wilson, J.
Bot. (Hooker) 3: 90. 3. 1841

Plants small, cespitose, dull, yellowish to dark green. Stems erect, to 0.5 cm. Leaves erect-appressed and straight or slightly flexuous when dry, broadly acuminate, 1.5–2 mm; margins mostly obscurely serrate distally, erect proximally; apex subcucullate. Specialized asexual reproduction absent. Seta 1 per perichaetium, 2–3 mm.

Capsule ovoid, 0.75–1 mm, smooth to obscurely striate-ribbed when dry; peristome teeth undivided, papillose.

Calyptra lobes one third to one half length of calyptra.

Capsules mature Sep–May. Tree bark, rarely rock and soil, humid sites; low to moderate elevations (0–300 m); Ala., Ark., Del., Fla., Ga., Ill., La., Miss., Mo., N.C., Okla., S.C., Tenn., Tex., Va., W.Va.

The leaves of *Ptychomitrium drummondii* are erect-appressed and straight or only a little curved when dry and, together with the bark substrate, make this dull dark green little moss easy to recognize. Sporophytes are very frequent and abundant. In urban areas in the southeastern United States, *P. drummondii* is often

frequent and abundant on trees in parks and campuses and along city streets.

Excluded Species:

Glyphomitrium canadense Mitten

This taxon was included for western Canada by G. N. Jones (1933), but was excluded from North America by H. A. Crum (1972) and L. E. Anderson et al. (1990). Crum considered *Glyphomitrium canadense* to be a synonym of the British *G. daviesii* (Withering) Bridel and suggested that the specimen on which Mitten based the name came from Great Britain.