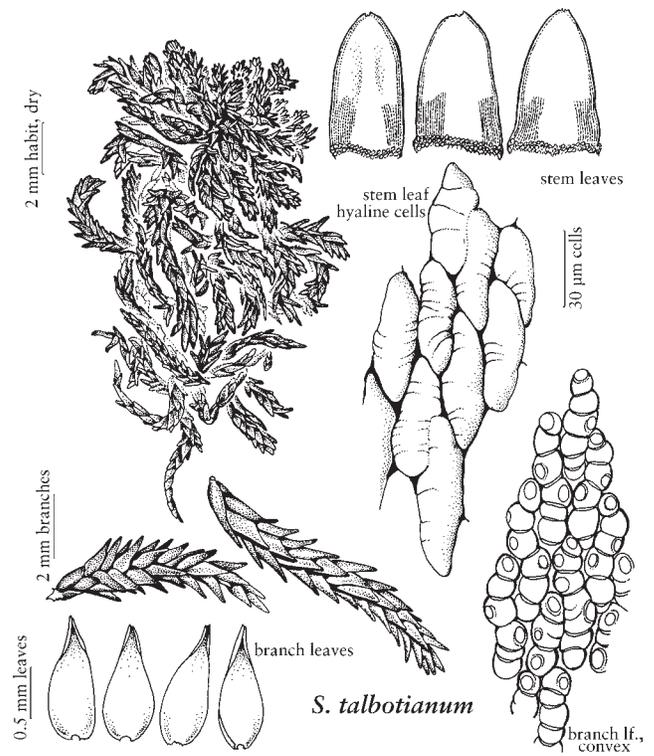


S. subnitens



S. talbotianum

SPHAGNUM

(K. I. Flatberg 1985; Cao T. and D. H. Vitt 1986). The metallic sheen and strongly pointed stem leaves will distinguish this species from the somewhat similar *S. capillifolium*. See also discussion under 83. *S. subfulvum*.

85. *Sphagnum subtile* (Russow) Warnstorf in C. Warnstorf et al., Krypt.-Fl. Brandenburg 1: 409. 1903



Sphagnum acutifolium var. *subtile* Russow, Arch. Naturk. Liv.-Ehst.-Kurlands, Ser. 2, Biol. Naturk. 10: 509. 1894; *S. nemoreum* var. *subtile* (Russow) Nyholm

Plants small to moderate-sized, slender and stiff, capitulum ± rounded, rarely flat-topped or stellate; green to variegated red-green especially in new growth, capitulum, and antheridial branches, without metallic sheen when dry. **Stems** green to reddish, superficial cortical cells aporse. **Stem leaves** broad-triangular to triangular lingulate, 0.9–1.2 mm, apex acute to slightly rounded, border strongly broadened at base (more than 0.3 width); hyaline cells mostly 0–1-septate, S-shaped to rhomboid. **Branches** not 5-ranked. **Branch fascicles** with 2 spreading and 2 pendent branches (rarely 1). **Branch leaves** 0.9–1.2 mm, ovate-lanceolate, 0.9–1.2 mm, concave, straight, apex involute; hyaline cells on convex surface with numerous

round to elliptic pores along the commissures (4–8), grading from small pores near apex to large pores at leaf base, concave surface with large round pores in proximal portions of leaf. **Sexual condition** dioicous. **Spores** 19–29 µm, finely papillose on proximal surface, more coarsely papillose on distal surface, conspicuous bifurcated Y-mark sculpture on distal surface; proximal laesura less than 0.5 spore radius.

Capsules mature late summer to early fall. Hummocks, fens, mires; low to moderate elevations; N.B., Nfld. and Labr. (Nfld.), N.S., Ont., Que.; Conn., Ill., Ind., Maine, Md., Mass., Mich., Minn., N.H., N.J., N.Y., N.C., Ohio, Pa., Vt., Va., W.Va., Wis.; Europe.

Sphagnum subtile forms small dense cushions and hummocks in damp coniferous forests and in the shaded portions of poor fens and ombrotrophic mires.

Sporophytes are common in *Sphagnum subtile*. Reports that the species is monoicous may be unreliable because of confusion with closely related species (C. B. McQueen 1989). Previous reports of this species from the west coast of North America are uncertain as well as are specimens from the interior of the continent (R. E. Andrus 1979) due to taxonomic confusion with *Sphagnum capillifolium* and *S. rubellum* (McQueen). However, this species is conspicuously distinct in gametophyte and spore morphology as well as niche. In the northern part of its range where it overlaps

ecologically with *S. quinquefarium*, the three spreading branches of the latter will distinguish it from *S. subtile*. It should be noted that contrary to the opinion of H. A. Crum (1997), *S. subtile* does not occur throughout the range of *S. capillifolium* but in North America is found over only a portion of the latter's eastern range, while being absent completely from its western range. See also discussion under 71. *S. capillifolium*.

86. *Sphagnum talbotianum* R. E. Andrus, Sida 22: 970, figs. 35–40. 2006 [E] [F]



Plants red pigmented; capitulum flat-topped and moderately dense. **Stem** red-tinged, cortex eporose. **Stem leaves** triangular-lingulate to lingulate with a more or less obtuse apex, 0.8–1.05 × 0.5–0.55 mm; border strongly developed at the base; hyaline cells rhomboid and 0–1-septate, efiibrillose and

eporose. **Branches** with leaves 5-ranked and loosely spreading. **Branch leaves** small, 1–1.2 × 0.3–0.35 mm; convex surface with moderate-sized pores, grading from 4–6 μm near apex to more than 20 μm at base, concave surface eporose except for occasional large round pores in proximal side regions. **Sexual condition** unknown.

Forming low hummocks in poor to medium fens in arctic and maritime tundra; low to moderate elevations; Alaska.

In the range of *Sphagnum talbotianum*, there are potentially three other species of sect. *Acutifolia* with quinquefarious branch leaves. *Sphagnum rubellum* has branch leaves somewhat subsecund and less strictly 5-ranked. It is also not clear whether there is even range overlap. *Sphagnum quinquefarium* has a more triangular stem leaf, and has some branch fascicles with three spreading branches. *Sphagnum warnstorffii* is most similar but macroscopically has a somewhat larger stem leaf. Microscopically, *S. warnstorffii* is readily distinguished by its tiny branch leaf pores.

87. *Sphagnum tenerum* Sullivant in A. Gray, Manual ed. 2, 611. 1856 [E]



Sphagnum capillaceum var. *tenerum* (Sullivant) H. A. Crum; *S. capillifolium* var. *tenerum* (Sullivant) H. A. Crum; *S. tenerum* var. *virginicum* H.A. Crum & L. E. Anderson

Plants ± robust, weak-stemmed, and compact, capitulum hemispherical, branches in capitulum short and blunt; typically mottled pale yellow-green and purplish red, without metallic sheen when dry. **Stems** pale yellow-green to pink; superficial cortical cells nearly always aporose. **Stem leaves** 1.4–1.8 mm, elongate-triangular, lingulate-triangular, hemisophyllous forms elongate triangular-ovate, 1.4–1.8 mm, apex usually conspicuously toothed, border narrow at base (less than 0.25 width); hyaline cells narrowly rhombic to S-shaped, can be efiibrillose and aporose but more commonly fiibrillose and porose, 0–1-septate. **Branches** turgid and terete, leaves, not 5-ranked. **Branch fascicles** with 2 spreading and 1–2 pendent branches. **Branch leaves** ovate, 1.1–1.7 mm, slightly concave, straight, apex weakly involute and conspicuously toothed; hyaline cells on the convex surface with round to elliptic pores along the commissures, grading from moderate-sized pores near apex to large pores at leaf base, concave surface with large round pores throughout. **Sexual condition** uncertain, monoicous or dioicous or possibly both. **Spores** 22–25 μm, finely roughened.

Damp sand and thin humus especially around pond margins, open savannas, and pine barrens; low to moderate elevations; Ala., Del., D.C., Fla., Ga., Ky., Md., N.J., N.Y., N.C., Pa., R.I., S.C., Tenn., Va.

Sporophytes are uncommon in *Sphagnum tenerum*. The sexual condition is uncertain because of past taxonomic confusion with *S. capillifolium* (R. E. Andrus 1980). *Sphagnum tenerum* is usually described (incorrectly) as having hemisophyllous stem leaves, and many collections of other species of sect. *Acutifolia* with such leaves have been called *S. tenerum*. When correctly characterized, *S. tenerum* is can be confused only with *S. capillifolium*, with which it has only a very small range overlap. Microscopically, besides the otherwise quite different *S.*

angermanicum, *S. tenerum* is the only species of sect. *Acutifolia* with large round free pores in most of the branch leaf hyaline cells on their concave surfaces. See also discussion under 71. *S. capillifolium*. Sexual condition and spore features were taken from H. A. Crum (1984).

The name *Sphagnum evansii* Warnstorf has also been used for this taxon.

88. *Sphagnum warnstorffii* Russow, Sitzungs.-Ber. Naturf.-Ges. Univ. Dorpat 8: 315. 1888



Sphagnum warnstorffianum Du Rietz

Plants small or less frequently moderate-sized, slender, capitulum flat-topped and stellate; green or dark purplish red and green, rarely green throughout, often with a distinctive bluish cast when dry. **Stems** red to green; superficial cortical cells aporose. **Stem leaves**

triangular-lingulate to lingulate, 1.1–1.4 mm, apex broad-rounded to narrowly truncate, border very broad at base (more than 0.3 width); hyaline cells e fibrillose, rhombic, mostly 1-septate but can be non-septate. **Branches** long and tapering, usually strongly 5-ranked. **Branch fascicles** with 2 spreading and 1–2 pendent branches. **Branch leaves** ovate-lanceolate, 0.9–1.4 mm, concave, straight, apex involute; hyaline cells on convex surface with very small ringed pores (less than 0.25 cell width) along commissures near apex, changing abruptly to large elliptical pores (0.4 cell width or more) basally, concave surface with large round pores in proximal margins and leaf base. **Sexual condition** dioicous. **Spores** 17–26 μm , finely papillose on both surfaces; proximal laesura less than 0.5 spore radius.

Capsules mature late summer to early autumn. Minerotropic, hygrophytic, frequent in medium to rich fens; low to moderate elevations; Greenland; Alta., B.C., Man., N.B., Nfld. and Labr. (Nfld.), N.W.T., N.S., Nunavut, Ont., Que., Sask., Yukon; Alaska, Colo., Conn., Idaho, Ind., Iowa, Maine, Md., Mass., Mich., Minn., Mont., N.H., N.J., N.Y., N.C., Ohio, Pa., R.I., S.Dak., Utah, Vt., Wash., Wis., Wyo.; Eurasia.

Sporophytes are uncommon in *Sphagnum warnstorffii*. This is one of the most minerotrophic species of the flora,

is hygrophytic, and has a very broad niche. The most commonly associated vascular plants are *Thuja occidentalis*, *Abies balsamea*, and *Picea rubens*. Bryophytes typically associated with it are *S. centrale*, *S. squarrosum*, *S. teres*, *Calliergonella cuspidata*, and *Campylium stellatum*. This species is perhaps most similar to *S. bartlettianum*, with which it has small range overlap. *Sphagnum warnstorffii* has a shorter and less sharply pointed stem leaf and the red color with a characteristic bluish caste compared to the crimson red of *S. bartlettianum*. See also discussion under 81. *S. russowii* and 86. *S. talbotianum*.

89. *Sphagnum wilfii* H. A. Crum in N. L. Britton et al., N. Amer. Fl., ser. 2, 11: 90, fig. 57. 1984 [E]



Plants densely tufted, capitulum \pm flat-topped; typically red; forms small tufts and hummocks in shaded and open sites. **Stems** red; superficial cortical cells aporose. **Stem leaves** 1.2 mm or more, broadly triangular to triangular-lingulate, 1.2 or more, apex acute, border broad at base (more than

0.25 width); hyaline cells mostly e fibrillose, 1–2-septate. **Branches** uncrowded, 5-ranked. **Branch fascicles** with 2 spreading and 1 pendent branch. **Branch leaves** ovate-lanceolate, 0.7 mm or more, straight, concave, loosely involute from apex to middle or near base; concave surface with few (2–4) small, rounded, or elliptical pores, especially in cell angles, concave surface aporose or with 1–2 pores at cell ends. **Sexual condition** unknown. **Spores** unknown.

Blanket mires, especially with *Pinus contorta*; low to moderate elevations; B.C.; Alaska.

The type locality of *Sphagnum wilfii* in the Queen Charlotte Islands of British Columbia is a site on a pygmy pine slope near the coast. This species has been collected only infrequently but is fairly common in southeastern Alaska. The combination of red pigment, the rather large and triangular to triangular-lingulate stem leaves and the quinquefarious, loosely spreading branch leaves should identify it where it occurs. See also discussion under 68. *S. bartlettianum*.