

***Sphagnum* Mosses**

The Stars of European Mires



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Contents

Preface	3
Glossary	8
Classification of <i>Sphagnum</i>	10
Distribution of <i>Sphagnum</i> mosses in Europe	10
European mires and <i>Sphagnum</i> mosses	11
Identification of <i>Sphagnum</i> species — where to find the distinguishing characteristics?	22
Subgenus <i>Rigida</i>	29
<i>Sphagnum compactum</i> DC.....	30
<i>Sphagnum strictum</i> Sull.....	35
Subgenus <i>Sphagnum</i>	39
<i>Sphagnum divinum</i> Flatberg & Hassel	40
<i>Sphagnum medium</i> Limpr.....	45
<i>Sphagnum austinii</i> Sull.....	49
<i>Sphagnum affine</i> Renauld & Cardot.....	53
<i>Sphagnum papillosum</i> Lindb.....	58
<i>Sphagnum palustre</i> L.....	63
<i>Sphagnum centrale</i> C.E.O. Jensen	69
Subgenus <i>Acutifolia</i>	77
Section <i>Squarrosa</i>	77
<i>Sphagnum squarrosum</i> Crome	78
<i>Sphagnum teres</i> (Schimp.) Ångstr.....	83
<i>Sphagnum tundrae</i> Flatberg	88
<i>Sphagnum mirum</i> Flatberg & Thinggaard	92
Section <i>Polyclada</i>	97
<i>Sphagnum wulfianum</i> Girg	97
Section <i>Insulosa</i>	101
<i>Sphagnum aongstroemii</i> C. Hartm.	101
Section <i>Acutifolia</i>	105
<i>Sphagnum angermanicum</i> Melin	106
<i>Sphagnum molle</i> Sull.....	110
<i>Sphagnum rubiginosum</i> Flatberg.....	114
<i>Sphagnum girgensohnii</i> Russow	119
<i>Sphagnum tescorum</i> Flatberg	124
<i>Sphagnum russowii</i> Warnst.	128
<i>Sphagnum fimbriatum</i> Wilson	132
<i>Sphagnum concinnum</i> (Berggr.) Flatberg.....	137
<i>Sphagnum arcticum</i> Flatberg & Frisvoll	141

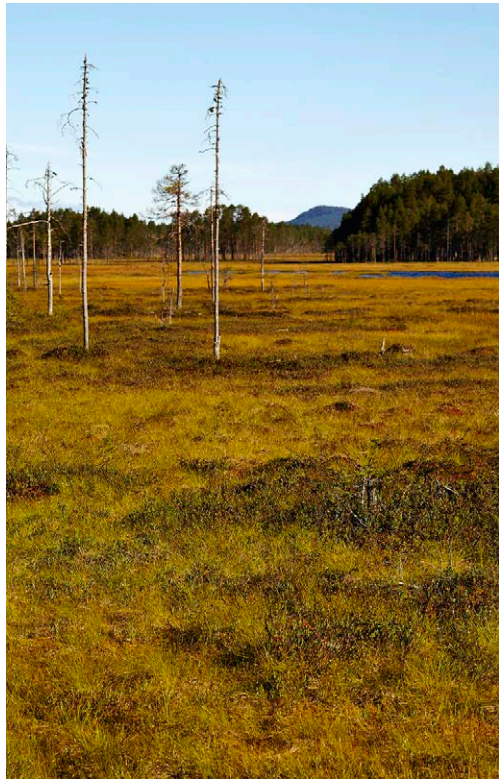
<i>Sphagnum olafii</i> Flatberg.....	145
<i>Sphagnum subnitens</i> Russow & Warnst.....	149
<i>Sphagnum subfulvum</i> Sjörs	154
<i>Sphagnum quinquefarium</i> (Braithw.) Warnst.....	158
<i>Sphagnum skyense</i> Flatberg.....	163
<i>Sphagnum warnstorffii</i> Russow.....	167
<i>Sphagnum rubellum</i> Wilson.....	172
<i>Sphagnum capillifolium</i> (Ehrh.) Hedw.....	176
<i>Sphagnum venustum</i> Flatberg.....	181
<i>Sphagnum beothuk</i> R. E. Andrus.....	185
<i>Sphagnum fuscum</i> (Schimp.) H. Klinggr.....	189
Subgenus Subsecunda	197
<i>Sphagnum pylaesii</i> Brid.	198
<i>Sphagnum subsecundum</i> Nees.....	202
<i>Sphagnum contortum</i> Schultz.....	207
<i>Sphagnum inundatum</i> Russow	211
<i>Sphagnum auriculatum</i> Schimp.....	216
<i>Sphagnum platyphyllum</i> (Braithw.) Warnst.....	222
Subgenus Cuspidata	229
<i>Sphagnum cuspidatum</i> Ehrh. ex Hoffm.....	230
<i>Sphagnum viride</i> Flatberg.....	236
<i>Sphagnum majus</i> (Russow) C.E.O. Jensen.....	240
<i>Sphagnum annulatum</i> H. Lindb. ex Warnst.....	245
<i>Sphagnum jensenii</i> H. Lindb.	249
<i>Sphagnum balticum</i> (Russow) C.E.O. Jensen	254
<i>Sphagnum troendelagicum</i> Flatberg.....	259
<i>Sphagnum tenellum</i> (Brid.) Pers. ex. Brid.....	263
<i>Sphagnum pulchrum</i> (Lindb. ex Braithw.) Warnst.....	268
<i>Sphagnum fallax</i> (H.Klinggr.) H.Klinggr.....	272
<i>Sphagnum isoviitae</i> Flatberg	277
<i>Sphagnum brevifolium</i> (Braithw.) Röhl.....	281
<i>Sphagnum angustifolium</i> (Russow) C.E.O. Jensen.....	285
<i>Sphagnum recurvum</i> P. Beauv.	290
<i>Sphagnum flexuosum</i> Dozy & Molk.....	294
<i>Sphagnum obtusum</i> Warnst.	299
<i>Sphagnum riparium</i> Ångstr.	304
<i>Sphagnum lindbergii</i> Schimp.	309
<i>Sphagnum lenense</i> H. Lindb.....	314
Bibliography	320
Impressions made by <i>Sphagnum</i> on Finnish students.....	326

Boreal zones

Northern string-flark fens (Aapa mires) are dominated by fens, with narrow ombrotrophic parts in high hummock strings and in the marginal areas. In the northern boreal zone high string-flark fens with elevated strings and mud-bottom/carpet flarks form the typical mire type. In the southern fringes, low string-flark mires, formation of flarks and hummock strings is usually weakly developed or missing.



Northern string-flark fen (aapa mire). N Finland.



Low string-flark fen (southern aapa mire). C Sweden.

Landscape with northern high string-flark fen complexes (northern aapa mires). NW Russia. Photo Tarmo Virtanen.





Typical raised bog. S Finland.

Raised bogs are the dominant feature in the boreal zone mire landscape. They have an ombrotrophic centre part shaped by peat growth, with usually narrow lagg zones of poor to rich fens in the margins, and ombrotrophic tree-covered parts of varying extent. These mire types include several geomorphological relief types

with different distributional patterns in Europe (eccentric raised bog, concentric raised bog, plateau raised bog, wooded (forest) raised bog). Typical features in raised bogs are hummocks, lawns, carpets, moss hollows and pools. **Atlantic raised bogs** often have several domes, lack forested parts and lagg zones.



Atlantic raised bog. W Norway. Photo Anders Lyngstad.

Identification of *Sphagnum* species — macroscopic features

Subgenus / Sect. / Species	Colour			Capitulum			Fascicle		Branch leaves			Stem leaves							
	Green	With some red	Brown (black) colour in stem	Apical bud very conspicuous	Capitulum stellate	Capitulum hemispherical	Number of divergent branches	Number of pendent branches	Concave/Cucullate	Curved	In 5-ranked rows	Big > 1.5 mm	Small < 1 mm	Triangular	Lingulate	Broadly spatulate	Acute apex	Cleft in apex	Lacerate
RIGIDA																			
<i>S. compactum</i>	(+)		+				1-3	1-3	(+)				+	+					
<i>S. strictum</i>							1-3	2-3	(+)										
SPHAGNUM																			
<i>S. divinum</i>	+	+					2	2	+			+			(+)	+		+	
<i>S. medium</i>	(+)	+					2	2	+			+			+				
<i>S. austinii</i>	(+)	+					2	1	+			+			(+)	+			
<i>S. affine</i>	+	(+)	+				2	1-2	+			(+)							
<i>S. papillosum</i>			+				2	2	+			+			+	(+)			
<i>S. palustre</i>	+		+				2	2-3	+			+			+	(+)			
<i>S. centrale</i>	+		+				2	2-3	+			+			+	+			
<i>S. compactum</i>	(+)		+				1-3	1-3	(+)				+	+					
<i>S. strictum</i>							1-3	2-3	(+)										
ACUTIFOLIA																			
Sect. Squarrosa																			
<i>S. squarrosom</i>	+			(+)			2-3	2-3		+		+			+				
<i>S. teres</i>	(+)		+	+			2-3	2-3				(+)			+				
<i>S. tundrae</i>	+			(+)			2	2-3							+				
<i>S. mirum</i>	+			+			2	1-2				+			+	(+)			
Sect. Insulosa																			
<i>S. aongstroemii</i>	+						2-3	2-3	+						+				(+)
Sect. Polyclada																			
<i>S. wulfianum</i>	+		+			++	4-5	4-6					+	+					
Sect. Acutifolia																			
<i>S. angermanicum</i>	(+)	(+)					2	1				+			+				(+)
<i>S. molle</i>	+	(+)					2	1-2	(+)			+			+				+
<i>S. rubiginosum</i>	(+)	(+)					3	1							+				+
<i>S. girgensohnii</i>	+			(+)	+		2	1				(+)			+				+
<i>S. tescorum</i>	(+)			+			2	1							(+)	+			+
<i>S. russowii</i>	(+)	+		(+)	+		2	1				(+)			+			(+)	(+)
<i>S. arcticum</i>			(+)				2	1-(2)							+	(+)			(+)
<i>S. olafii</i>	(+)		(+)				2	1-(2)							+			(+)	
<i>S. fimbriatum</i>	+			+			2-3	1				(+)	(+)		+				+
<i>S. concinnum</i>							2	1-(2)							+				+
<i>S. quinquefarium</i>	(+)	+				(+)	3	2			+		(+)	+	(+)		+		
<i>S. skyense</i>		+	(+)				2-3	(1)-2			(+)	(+)		+	(+)		(+)		
<i>S. subnitens</i>		+					2	1-2				+		+	(+)				
<i>S. subfulvum</i>		(+)	+				2	1				(+)			+				
<i>S. warnstorffii</i>	(+)	+			+		2	1-2			+		(+)	+	+				
<i>S. rubellum</i>		+					2	1			+		(+)	+	+				
<i>S. capillifolium</i>	(+)	+			+		2	1-2					(+)		(+)		(+)		
<i>S. venustum</i>	(+)	(+)			(+)		2	1			(+)						(+)		
<i>S. beothuk</i>			+		+		2	1			(+)				+				(+)
<i>S. fuscum</i>			+										(+)		+				

Identification of *Sphagnum* species — macroscopic features

Subgenus /Sect. / Species	Colour			Capitulum			Fascicle		Branch leaves			Stem leaves							
	Green	With some red	Brown (black) colour in stem	Apical bud very conspicuous	Capitulum stellate	Capitulum hemispherical	Number of divergent branches	Number of pendent branches	Concave/Cucullate	Curved	In 5-ranked rows	Big > 1.5 mm	Small < 1 mm	Triangular	Lingulate	Broadly spatulate	Acute apex	Cleft in apex	Lacerate
SUBSECUNDA																			
<i>S. pylaesii</i>							0-2	0	+			+							(+)
<i>S. subsecundum</i>			+				2-3	2-3	+	+			+	+					
<i>S. contortum</i>	(+)		(+)				2-3	2-3	(+)	(+)				+	+				
<i>S. inundatum</i>	+		+				2-3	2-3							+				
<i>S. auriculatum</i>	(+)		(+)				2-3	1-2	(+)						+				
<i>S. platyphyllum</i>			+	(+)			1-3		+			+							
CUSPIDATA																			
<i>S. cuspidatum</i>	(+)						2	2-3				(+)		+			+		
<i>S. viride</i>	+						2	2-3						(+)			+		
<i>S. majus</i>	(+)						2	2					(+)	(+)	+		(+)		
<i>S. annulatum</i>				(+)			2	1-2					(+)	(+)	+		(+)		
<i>S. jensenii</i>							2	1-2				+		(+)	+				
<i>S. balticum</i>							2	1			(+)		(+)	(+)	(+)				
<i>S. troendelagicum</i>					(+)		2	1						(+)	+		(+)		
<i>S. tenellum</i>	+						2	1	(+)				(+)		+				
<i>S. pulchrum</i>	(+)		(+)				2	2			+		+	+			+		
<i>S. fallax</i>	+				(+)		2	2			+		(+)	+			(+)		
<i>S. isoviitae</i>					(+)		2	2			+		(+)	+			+		
<i>S. brevifolium</i>							2	2			(+)		(+)	+			+		
<i>S. angustifolium</i>	+					+	2	2					+	+					
<i>S. recurvum</i>	+				(+)		2	2-3			+		(+)	(+)	(+)			+	(+)
<i>S. flexuosum</i>	+					(+)	2	2-3					(+)	+	(+)			(+)	(+)
<i>S. obtusum</i>	(+)						2	2			+	(+)		(+)	(+)				(+)
<i>S. riparium</i>	+			+			2	2				+		(+)	+			+	
<i>S. lindbergii</i>			+	+			2	2			+	+				+		+	+
<i>S. lenense</i>							2	1-2					+					+	+



Stellate capitulum and branch leaves in 5-ranked rows.

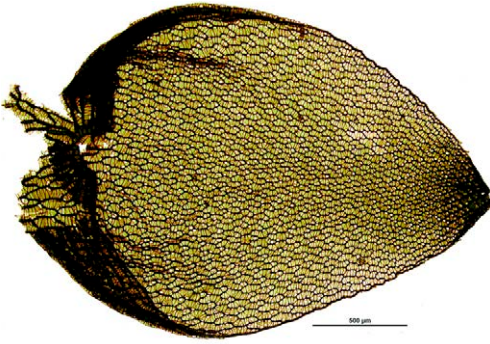


Conspicuous apical bud.

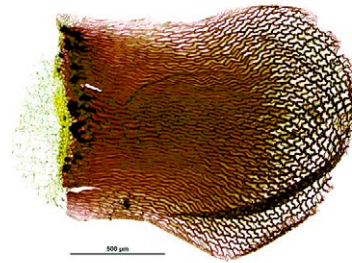


Hemispherical capitulum.

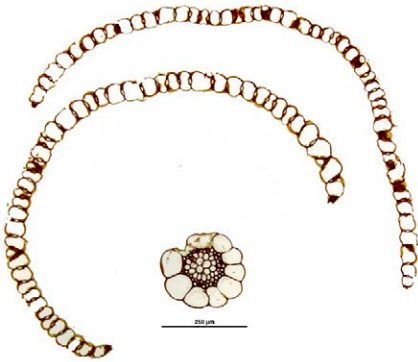
Subgenus *Sphagnum*



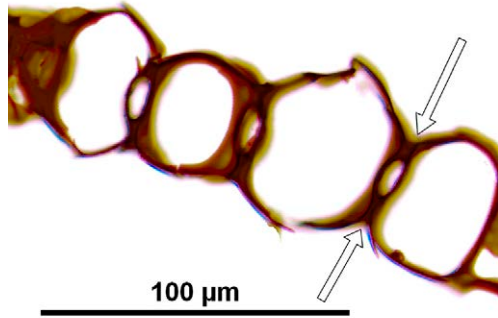
Branch leaf from convex side. Scale bar length 500 μm.



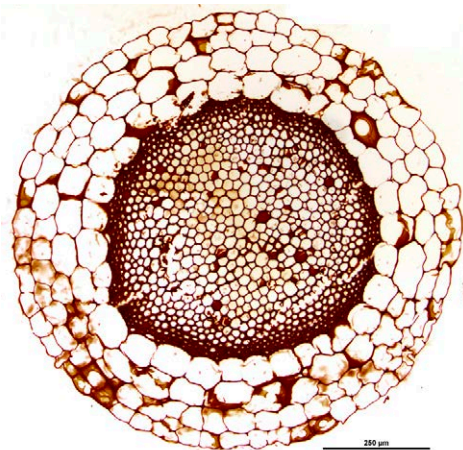
Stem leaf from convex side. Scale bar length 500 μm.



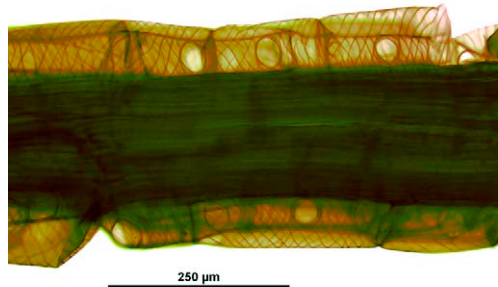
Cross section of branch stem and branch leaves. Scale bar length 250 μm.



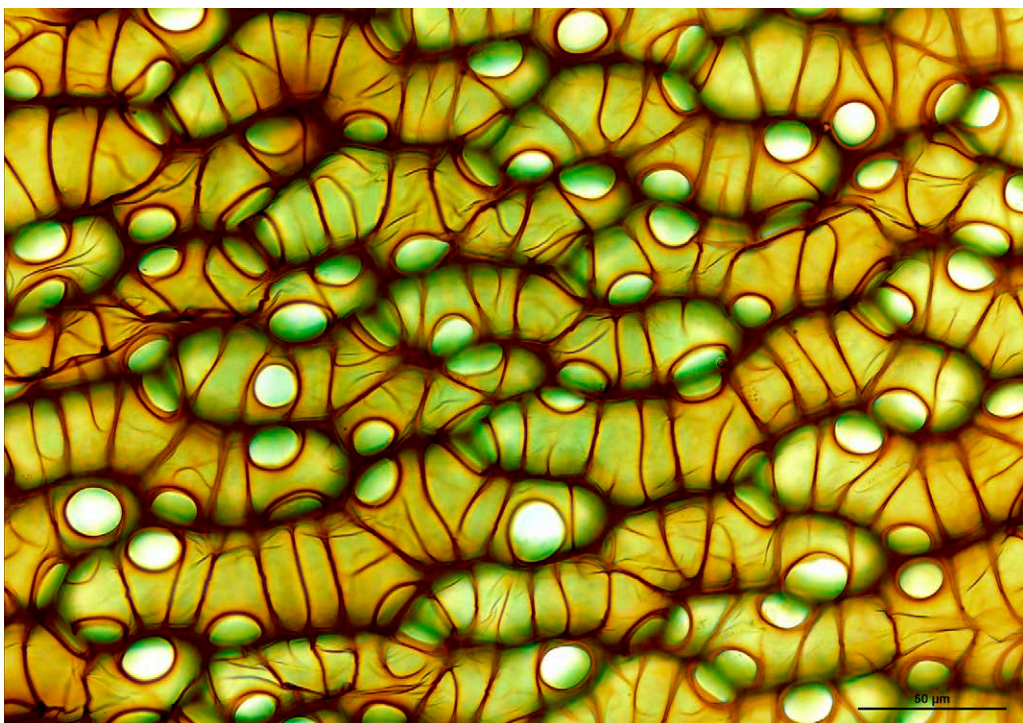
Cross section of branch leaf. Photosynthetic cells are very narrowly exposed on both surfaces.



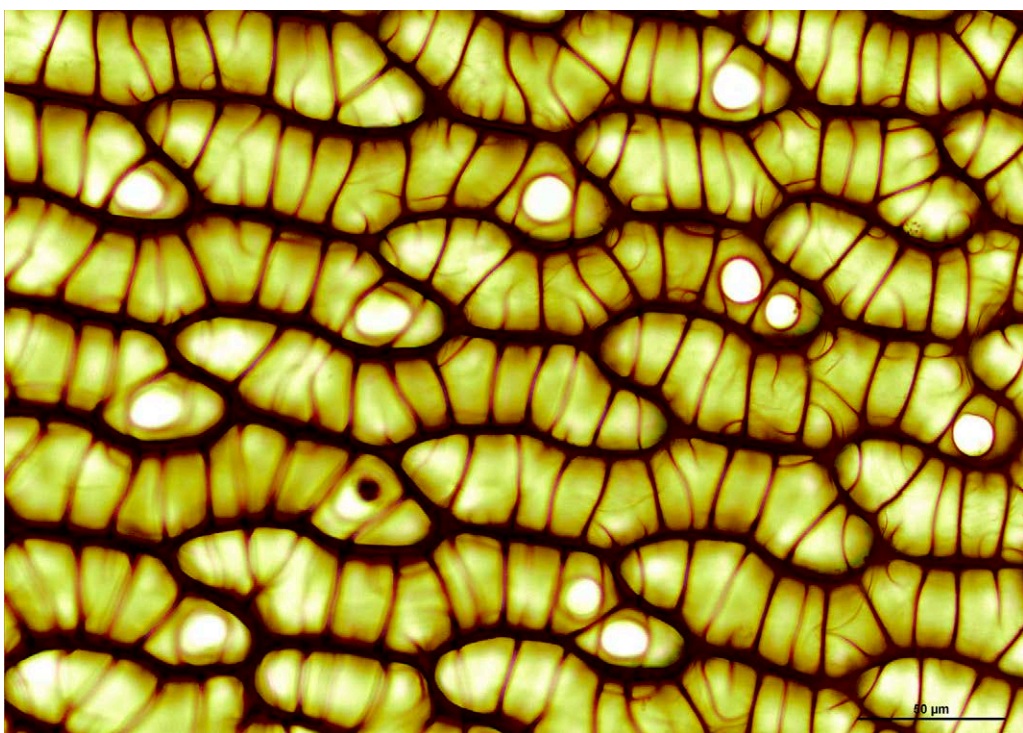
Cross section of stem. Scale bar length 250 μm.



Branch stem with leaves removed, showing the fibrillous cortical cells, typical of subgenus *Sphagnum*.



Branch leaf cells from convex surface (above) and from concave surface (below). Scale bar length 50 μm.



S. divinum

S. austinii

S. affine

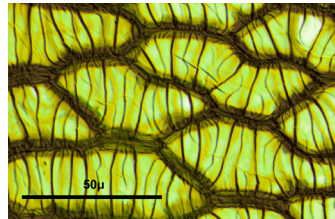
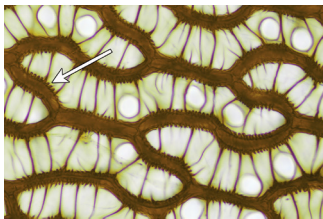
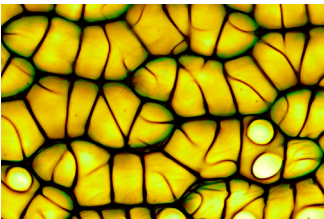
Capitulum



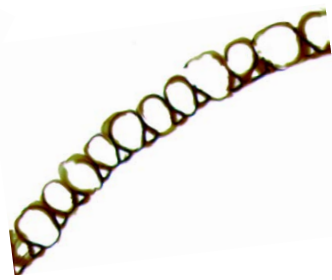
Stem leaf with leaf edge



Branch leaf cells



Cross section of leaf



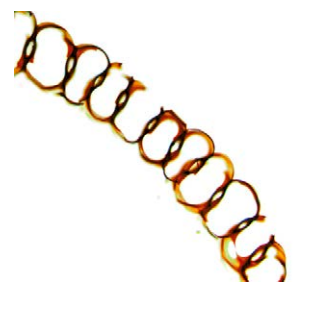
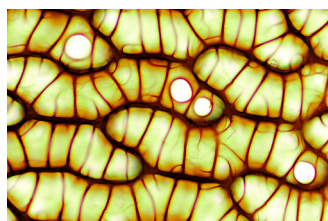
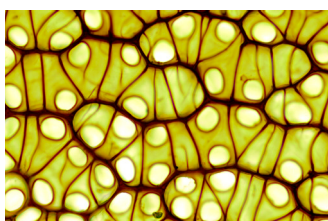
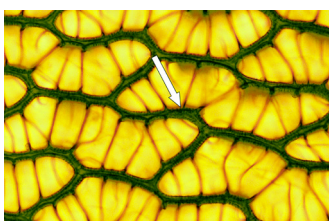
S. papillosum



S. palustre



S. centrale





Sphagnum divinum

Subgenus *Acutifolia*

Section *Squarrosa*

Plants vary from small to robust and have a large apical bud. The colour of the plants is green or yellowish, and occasionally brownish. Stem leaves are erect or hanging and have lingulate shape, with broadly rounded apices. Branch leaves are ovate to ovate-lanceolate. The leaf tips of *S. squarrosum* are spreading (squamose). Also the shade forms of *S. teres*

may have squarrose leaves, this is, however, more pronounced when the moss is dry. Hyaline cells have pores in both sides; photosynthetic cells are triangular to trapezoidal and exposed on both surfaces but more widely on the convex surface. Stem is green or light brown and has a cortex of 2–4 layers. Retort cells in branch cortex have indistinct necks.



Sphagnum squarrosum