



### General notes on field identification of *Sphagnum*

## Field key to *Sphagnum*

*Sphagnum* species have a reputation for being difficult to name. While it is impossible to identify every *Sphagnum* specimen in the field, with experience, and if examining typical, well-grown plants, virtually all the species can be identified with confidence. These include almost all of the commoner and most widespread species.

All 34 species found in the British Isles are described and illustrated in the species accounts (pp. 276–310). In order to simplify identification of the more widespread species, the five rarest and most local species, recorded in less than 50 10-km grid squares in Great Britain and Ireland since 1950, are excluded from the keys that follow.

It is best to take identification of *Sphagnum* specimens as far as possible in the field. The full range of variation can be assessed, more typical material can be searched for, and colours (if not too dry), are at their most distinctive. Most *Sphagnum* species can vary in appearance and all species have occasional, atypical forms that are problematic. Therefore, when in the field assess the range of variation presented by the plants, and concentrate on the more widespread forms, at least initially. Even if identification to species cannot be achieved, the possibilities can quickly be narrowed down to groups of two or three species. Identification to species level then requires examination under a microscope.

The characters of each species of *Sphagnum* vary, with some species much more variable than others. Almost all statements in the keys and accounts should include words such as 'usually'. To avoid repetition, such words have been largely omitted – but be aware of this! While there is no substitute for field experience, drawing attention to some examples of variation in sphagna will speed up the learning process.

- The majority of species can at times be green, usually when shaded. However, the majority when well-illuminated develop secondary pigments, for example red or orange. Even quite limited shade, for example under ling heather (*Calluna*) can produce areas of green plants contrasting with red in the open, even within the same cushion, for example *S. capillifolium* or *S. magellanicum*.
- Male plants of dioicous species often look different in late summer and autumn. Then the outer capitulum branches and those just below have swollen club-shaped ends which are distinctly darker and/or differently coloured than the rest of the branch. Within these are the male reproductive organs containing the male gametes.
- Some species have secondary pigmentation best developed in the autumn and winter (e.g. *S. palustre*), or in late summer (e.g. *S. lindbergii*, in areas where snow lies late in the year). Similarly, plants that have been inundated for a significant period during the winter can look very dingy during spring (e.g. *S. pulchrum*).
- Sphagna growing in exposed (e.g. coastal or montane) sites are often more compact and a duller colour than the same species in sheltered sites. For example, both *S. subnitens* and *S. girgensohnii* can occur as dense, compact cushions in exposed situations – quite different from their more familiar forms.
- Within a limited geographical area, it is possible to quite quickly gain familiarity with all the local species, and their range of appearance or jizz. Seeing an unusual form of a familiar species in a different area can occasionally

be a puzzling experience. Don't panic – just be methodical in working through the keys, and avoid jumping to hasty conclusions about a specimen's identity.

- Aberrant plants may have stem leaves very similar to the branch leaves, whereas more typical plants of the same species have stem leaves markedly different from the branch leaves.
- Aquatic and terrestrial forms of the same species may look different. For example, *S. cuspidatum* has an extreme feathery aquatic form, the common bog-pool form and a terrestrial form with more or less stellate capitula.
- Lastly, do not assume that an unfamiliar *Sphagnum* is one of the rare species. An odd form of a commoner species is, unfortunately, much more likely!

### Species excluded from the keys

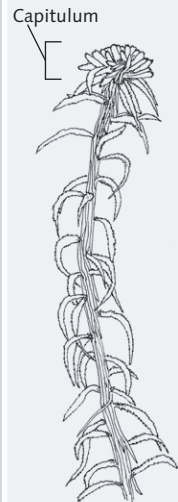
*Sphagnum skyense*, *S. majus*, *S. balticum*, *S. riparium* and *S. lindbergii* are excluded from the keys, but are included in the species accounts. As experience is gained, and especially if looking at sphagna in western or upland areas, the accounts of these species should be studied. Only *S. balticum* appears to be genuinely rare, while *S. skyense* and *S. majus* are almost certainly under-recorded.

### Identifying *Sphagnum* species in the field

There is no single best way to learn to identify *Sphagnum* species. Here we suggest a pragmatic approach to field identification, by providing a tabular key to 8 species and 5 groups of species (pp. 64–65). These are the minimum number of 'groups' that the 29 species can be assigned to when keyed out. Once a specimen has been allocated to a species or to a group, either read and compare the species accounts, or use the appropriate dichotomous key referred to in the table (keys 1–4, pp. 66–70).

Use of the guide and keys will become easier with practice, especially if immediate help is available to confirm or correct identifications. At least to start with, check the character being investigated several times.

### *Sphagnum* features



A typical *Sphagnum* shoot

The basic form of a single, non-fertile shoot is shown on the left.

#### ■ Stem cortex

To assess the width of the stem cortex, remove several branches and break the stem cleanly there (push thumbnails into stem while pulling apart). Squeeze and release one broken end to remove water while viewing the cross-section with a  $\times 10$  hand lens. The wide cortex of Section *Sphagnum* is easily visible as a wide, white, outer ring around the stem. In all other Sections the stem cortex is invisible or only just discernible.

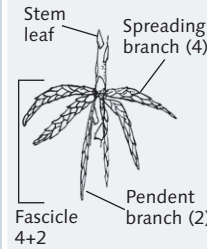


#### ■ Stem-leaf shape

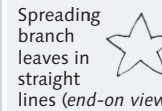
In most species, stem-leaf shape is easily seen by removing the capitulum from a stem, and removing a few branches from near the stem tip, until one or more stem leaves can be seen projecting above the broken end of the stem.

#### ■ Stem-leaf orientation

To establish stem-leaf orientation, carefully expose a section of stem 1–3 cm below a capitulum, either by parting the branches with a sharp point, or by removing several fascicles. View the cleared stem with a  $\times 10$  hand lens; repeat several times until you can be confident about the orientation of the stem leaves.



Spreading branch leaves in straight lines (side view)



Spreading branch leaves in straight lines (end-on view)



Two developing branches between rays of capitulum



Capitulum with prominent terminal bud

### Tabular key to Sections and selected species

Are they erect and appressed, or hanging and  $\pm$ appressed, or sticking out to some extent and appearing randomly oriented? Removal of fascicles can dislodge stem leaves so try and view an undisturbed section of the stem. Note, even in species where stem leaves are hanging, those immediately below the capitula are usually more or less erect.

#### ■ Number of spreading and pendent branches in a fascicle

Again, careful manipulation of branches with a sharp point usually allows the branch number to be counted and the degree of differentiation assessed. However, on very compact shoots, for example *S. austinii* and *S. compactum*, this is impossible in the field, and is difficult on species with untidily intertwined branches, for example *S. subnitens*. The number of spreading branches is usually quite easily seen on those species where it is used as an identifying character.

#### ■ Branch-leaf size and shape

Unless otherwise stated, this should be assessed from fully grown leaves selected from the mid-point along spreading branches.

#### ■ Branch-leaf arrangement

Some species have leaves of spreading branches arranged in straight lines. To assess this character, view the upper spreading branches with a  $\times 10$  hand lens. Look at the branches from the side and from above, and also view one or two branches end on. If branch leaves are in straight lines, there will be 5 rows of leaves and a branch end will have the appearance of a 5-pointed star.

#### ■ Juvenile or developing branches

To view the young developing branches of a stellate capitulum, the lower part (almost the underside) of the capitulum needs to be scanned with a  $\times 10$  hand lens from the side, with the capitulum still in place.

#### ■ Terminal bud

A conical bud, at the apex of the stem, is present in the centre of the capitulum in some species, for example *S. teres* and *S. fimbriatum*.

#### ■ Shoot size

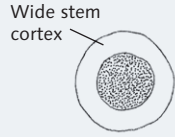
Diameter of *Sphagnum* shoots is best considered a relative measure, applicable when comparing different species at the same site. As a rough guide, when wet:

- robust shoots . . . . .  $>2.5$  cm wide
- large shoots . . . . . 1.5–2.5 cm wide
- medium shoots. . . . . 1.0–1.5 cm wide
- small shoots . . . . . 0.5–1.0 cm wide

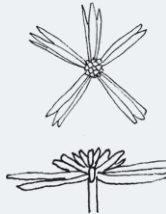
The table overleaf lists five groups of species and eight individual species, to which a *Sphagnum* specimen should first be allocated. The characters given are unique to that group or individual species. Initially it will be necessary to start at the top and work down the table until a set of characters is reached that matches your specimen. As familiarity is gained, the table can be used as an aide memoir.

Smith's *Flora* and this guide divide *Sphagnum* species into six Sections, comprising related species. These are indicated in the table, and at the top corner of the pages carrying species accounts.





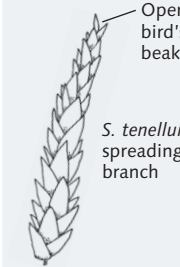
Wide stem cortex



Stellate capitulum (viewed from above)  
Single developing branch between rays of capitulum

Field characters	Key or species accounts	Section
<ul style="list-style-type: none"> <li>Stem cortex conspicuous, its thickness about <math>\frac{1}{3}</math> of stem radius; branch leaf apices hooded.</li> </ul>	<p><b>Key 1</b> (5 species) (p. 66) <b>Species accounts</b> (pp. 276–280)</p>	Sphagnum
<ul style="list-style-type: none"> <li>Spreading branches swollen and <math>\pm</math>smooth in appearance, curved and resembling a cow's horns (or more rarely straight); branch leaves near base of spreading branches <math>\pm</math>straight when viewed from above; fascicles of 1–4(5) branches; spreading and hanging branches little different in appearance.</li> </ul>	<p><b>Key 2a</b> (p. 67) <i>S. platyphyllum</i> (p. 300) <i>S. denticulatum</i> (p. 298)</p>	Subsecunda
<ul style="list-style-type: none"> <li>Spreading branches not smooth in outline owing to branch leaves sticking out; branches <math>\pm</math>straight or curved; branch leaves at base of spreading branches with apices curved to one side when viewed from above; fascicles of 4–7 branches; spreading and hanging branches somewhat differentiated.</li> </ul>	<p><b>Key 2b</b> (p. 67) <i>S. subsecundum</i> (p. 296) <i>S. inundatum</i> (p. 297) <i>S. contortum</i> (p. 299)</p>	Subsecunda
<ul style="list-style-type: none"> <li>Stem leaves erect, lying flat against stem. If capitula stellate (viewed from above), developing branches between rays of capitula (viewed from side) arranged singly.</li> </ul>	<p><b>Key 3</b> (8 species) (pp. 68–69) <b>Species accounts</b> (pp. 283–293)</p>	Acutifolia
<ul style="list-style-type: none"> <li>Stem leaves large, of the size and sometimes the shape of branch leaves, orientated variously; branch leaves broad, widest at middle of leaf, concave, not abruptly narrowed towards tip of leaf; plants pale green or almost white, with a hint of pink, never strongly coloured; in discrete patches, in which each capitulum is surrounded by upward-pointing branches.</li> </ul>	<p><i>S. molle</i> (p. 293) Mainly western, also southern heaths, local</p>	Acutifolia
<ul style="list-style-type: none"> <li>Stem dark brown or black; branch leaves blunt-ended, lying along branches to spreading; brightly coloured, green, ochre, orange-brown or yellowish, with colours frequently mixed in any one patch. Usually in dense, smooth patches with individual capitula hard to discern, in <math>\pm</math>open peaty ground, for example bare peat, gravel-covered peat, and amongst rocks.</li> </ul>	<p><i>S. compactum</i> (p. 295) Widespread</p>	Rigida
<ul style="list-style-type: none"> <li>Stem leaves tiny, only about <math>\frac{1}{4}</math> length of branch leaves</li> </ul>	<p><i>S. strictum</i> (p. 294) Western, local – mainly Scotland and Ireland</p>	Rigida

Capitulum with prominent terminal bud



Two developing branches between rays of capitulum

<ul style="list-style-type: none"> <li>Shoots large; bright green; terminal bud <math>\pm</math>overtopped by inner capitulum branches (view from side); branch leaves strongly curved away from branches, pointed.</li> </ul>	<p><i>S. squarrosom</i> (p. 281) Widespread</p>	Squarrosa
<ul style="list-style-type: none"> <li>Shoots medium; green with a ginger tint, to ginger-brown, usually with contrasting green capitulum centre and terminal bud; large terminal bud projecting conspicuously beyond capitulum branches (view from side); branch leaves <math>\pm</math>lying along stem.</li> </ul>	<p><i>S. teres</i> (p. 282) Widespread</p>	Squarrosa
<ul style="list-style-type: none"> <li>Shoots small; fragile; orange, yellow or green; branch leaves egg-shaped, concave, the two leaves at the end of a spreading branch forming an open bird's beak shape when viewed from the side; stem leaves large for size of plant, visible between branches, most sticking out from the stem.</li> </ul>	<p><i>S. tenellum</i> (p. 301) Widespread</p>	Squarrosa
<ul style="list-style-type: none"> <li>Shoots whitish-green, green or brownish-green; aquatic or bog pool forms when removed from water look like sodden fur; capitula branches untidily arranged; young, developing branches between rays of capitula (viewed from side) either not visible (usually) or arranged singly; branch leaves towards branch tips narrow and curved, often long and needle-like; stem leaves triangular, pendent to slightly spreading, longer than wide, sharply pointed; growing in wet to very wet areas, often submerged or emergent</li> </ul>	<p><i>S. cuspidatum</i> (p. 302) Widespread</p>	Cuspidata
<ul style="list-style-type: none"> <li>Shoots yellow, orange, green, or brownish-green; capitula branches <math>\pm</math>tidily arranged; young, developing branches between rays of capitula (viewed from side) in pairs; branch leaves in straight lines or not; branch leaves straight (not curved or long and needle-like towards branch tips); spreading and hanging branches little to clearly differentiated; stem hidden by or <math>\pm</math>visible through hanging branches; stem leaves pointing downwards, lying flat against stem; growing in damp to wet places, not usually submerged.</li> </ul>	<p><b>Key 4</b> (p. 70) <i>S. fallax</i> (p. 306) <i>S. angustifolium</i> (p. 307) <i>S. flexuosum</i> (p. 308)</p>	Cuspidata
<ul style="list-style-type: none"> <li>Golden yellow-brown to chestnut; branches short and fat, tapering to tip and base; branch leaves in conspicuous straight lines; stem leaves triangular, pendent to spreading, with a distinct point or cusp at the apex.</li> </ul>	<p><i>S. pulchrum</i> (p. 305) Local</p>	Cuspidata

Dichotomous keys to Sections and selected species

Key 1

Notes. Species in this group, (Section Sphagnum) are generally easy to pick out (robust, swollen shoots; branch leaves very concave; apices blunt and hooded). Typical forms of four of the five species are, with experience, easy to identify, but all the species within the group can be problematic in the field.

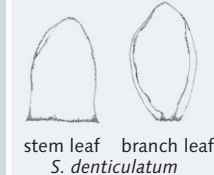
- 1 ■ At least some leaves, in capitula or on spreading branches, red or pink, or with a hint or flecks of red or pink . . . . . 2
  - Red or pink colours absent from leaves . . . . . 3
  
- 2 ■ Dull crimson colour present in at least some leaves; capitula and branches similar in colour; stem red or blackish-red (hold up against the light); spreading branches short and blunt-ended. Frequent, bogs . . . . . *S. magellanicum* (p. 280)
  - Pinkish-orange or brick-red colour present in capitula and possibly some branches; capitula a different colour from and darker than branches; stem green or brown; spreading branches long and tapering. Common and widespread, not usually on bogs . . . . . *S. palustre* (p. 279)
  
- 3 ■ Ochre-brown to chestnut, with greenish centre to capitula; upper, spreading branches pressed around capitula; spreading branches short with ±pointed ends; stem concealed by closely packed branches; forming solid, often conspicuous hummocks in which the individual shoots are hard to make out. Uncommon, bogs . . . . . *S. austinii* (p. 276)
  - Not as above . . . . . 4
  
- 4 ■ Plants usually green or greenish, but can be yellowish or ochre; capitulum centre often markedly darker than surrounding spreading branches; spreading branches long and tapering; outer leaves of spreading branches usually at an angle of <45° to branch inner leaves usually more widely spreading and with leaf tips often ±recurved; up to 4 pendent branches per fascicle. Common and widespread, not usually on bogs . . . . . *S. palustre* (p. 279)
  - Plants ochre, occasionally greenish; capitula and branches similar in colour; upper spreading branches short with blunt ends; spreading branch leaves distinctly sticking out with many at an angle of 45–90° to branch and leaf tips not recurved; 1–2 pendent branches per fascicle. Common and widespread, especially on bogs . . . . . *S. papillosum* (p. 278)

*S. affine* (p. 277) is very close in appearance to some forms of *S. palustre* and *S. papillosum*, and is not reliably separable from these in the field. Green- or ochre-coloured plants growing in compact cushions, low hummocks or carpets, in wet poor-fens or marshes, with short pointed spreading branches should be collected for examination under a microscope.

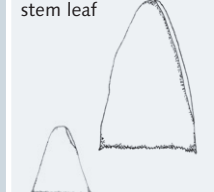
Key 2

Notes. The majority of specimens of the five species in this group (Section Subsecunda) fall into two groups (see tabular key on pp. 64–65). *S. subsecundum*, *S. contortum* and *S. platyphyllum* are consistent in their appearance and so are fairly easy to determine in the field with experience. Typical forms of *S. denticulatum* and *S. inundatum* are also easily identified. However, both are variable, especially *S. denticulatum*, which can sometimes look like *S. platyphyllum* or *S. inundatum*. *S. inundatum* can sometimes approach typical *S. denticulatum*, and sometimes can be small enough to look like *S. subsecundum* (though in such cases there will usually be some shoots of *S. inundatum* with more typically sized branches and/or capitula). Specimens will be found that, while obviously belonging to the *S. denticulatum/inundatum* pair of species, cannot be assigned to either with confidence.

Key 2a  
*S. platyphyllum*  
stem leaf

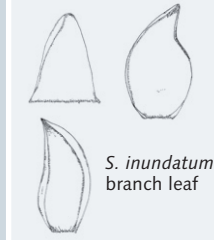


Key 2b  
*S. inundatum*  
stem leaf



*S. subsecundum*  
stem leaf (size relative to *S. inundatum*)

*S. contortum*  
stem leaf branch leaf



- 1 ■ Shoots small, occasionally medium-sized, green, greenish-brown or brown; capitula poorly developed, consisting mainly of a large, conspicuous terminal bud; fascicles of 1–3 branches, not concealing stem; stem leaves appear large, about as large as branch leaves, widely oval and very concave; stem pale. Uncommon, local, base-rich marshes and flushes. . . . . *S. platyphyllum* (p. 300)
  - (Small forms of periodically inundated *S. denticulatum* will key out here.)
  - Shoots large, occasionally medium, rarely small; colour very variable – dull green, yellow, yellowish-orange, coppery red; capitula well-developed, terminal bud inconspicuous; fascicles of 3–4(5) branches ±concealing stem; stem leaves shorter than branch leaves, tongue-shaped to triangularly tongue-shaped; stem dark, at least in part. Common, widespread . . . . . *S. denticulatum* (p. 298)
  
- 1 ■ Stem dark brown or black, at least in part . . . . . 2
  - Stem pale brown or pale green . . . . . 3
  
- 2 ■ Shoots medium, occasionally large, yellow, yellowish-orange, occasionally greenish; capitula branches straight or with outer part curved; stem leaves easy to see, triangularly tongue-shaped, concave, orientated variously. Common, widespread . . . . . *S. inundatum* (p. 297)
  - (Some forms of *S. denticulatum* will key out here.)
  - Shoots small, delicate, yellow, yellowish-orange, rarely greenish; capitula branches curved in towards centre; stem leaves small, hard to discern, ±triangular, ±flat, mostly hanging with some sticking out. Uncommon, base-rich marshes . . . . . *S. subsecundum* (p. 296)
    - (Small forms of *S. inundatum* will key out here.)
  
- 3 ■ Shoots medium; colour pinkish-orange, greenish-brown; stem leaves ±triangular; cortex of stem in cross-section (break stem) visible at ×10 as a narrow, pale ring around the dark centre; stem completely pale. Occasional, base-rich marshes . . . . . *S. contortum* (p. 299)
  - Shoots medium, occasionally large, yellow, yellowish-orange, occasionally greenish; stem leaves triangularly tongue-shaped; cortex of stem in cross-section (break stem) not discernible at ×10; stem usually dark in part. Common, widespread. . . . . *S. inundatum* (p. 297)
    - (Some forms of *S. denticulatum* and *S. contortum* will key out here.)

Key 3

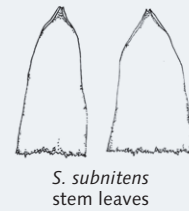
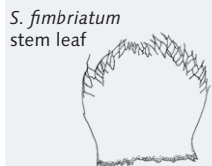
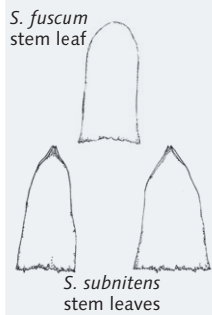
*Notes.* All those species with fine-pointed, red or pink branch leaves belong to this group (Section Acutifolia). In shade, normally red/pink-coloured species can be green, completely or almost completely so. Careful checking of a collection of shoots will usually reveal some traces of red/pink in the leaves of green specimens of normally red/pink species. When checking shoots in this way, beware of confusing different species growing together. NB: several species in Key 4 (Section Cuspidata) can have obvious pink in the stem or branches (where these meet the stem), but never in the leaves.

Also belonging to Section Acutifolia are *S. molle* (see tabular key on pp. 64–65, and species account p. 293) and the rare (but very locally frequent and probably under-recorded *S. skyense*, p. 292).

- 1 ■ Plants green or brown, no trace of red or pink present in leaves or stem (check carefully) . . . . . 2
  - At least traces of red and/or pink present in leaves and/or stem (check carefully) . . . . . 6
- 2 ■ Shoots brown, greenish-brown or dingy brownish. . . . . 3
  - Shoots green or pale whitish-green . . . . . 4
- 3 ■ Shoots small, ginger-brown, occasionally greenish-brown; stem leaves parallel-sided with broad, rounded tip; forming firm hummocks, which are often large and prominent . . . . . *S. fuscum* (p. 290)
  - Shoots medium, light brown or dingy brownish; stem leaves triangular or with upper half of leaf triangular, with a pinched, sharp tip; forming patches or soft cushions . . . . . *S. subnitens* (p. 291)
 

*(Atypical brownish colour form)*
- 4 ■ Terminal bud of capitulum easily seen with ×10 hand lens. . . . . 5
  - Terminal bud inconspicuous or invisible even with ×10 hand lens; (green forms of plants normally with some red or pink – check nearby shoots or patches of shoots with same jizz for red or pink, but beware mixed-species stands) . . . . . 6
- 5 ■ Shoots feeble and floppy when held erect; terminal bud large in proportion to capitulum, very conspicuous; stem leaf broader at tip than at base, and markedly tattered across the whole of the broad tip, stem leaves forming an 'Elizabethan ruff' around the top of the stem when capitulum removed . . . . . *S. fimbriatum* (p. 283)
  - Shoots stiff when held erect; terminal bud small in proportion to capitulum; stem leaf parallel-sided or with slightly narrowed waist, with broad rounded, fringed or centrally notched tip. . . . . *S. girgensohnii* (p. 284)
 

*(Take especial care at dichotomy 6)*
- 6 ■ Stem leaves ±triangular, or triangular in the upper half with a pinched, sharp tip . . . . . 7
  - Stem leaves parallel-sided with broad, rounded tip, possibly with a small notch, or pointed (but without a pinched, sharp tip) . . . . . 8



*S. quinquefarium* stem leaf



*S. capillifolium* subsp. *capillifolium* stem leaf



*S. russowii* stem leaf

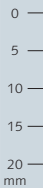
*S. warnstorffii* stem leaves



*S. capillifolium* subsp. *rubellum* stem leaf



- 7 ■ Shoots green, or green and salmon pink, with green concentrated in centre of capitula, colour often dingy; shoots untidy and tangled in appearance owing to density of branches, shoots looking top heavy; fascicles of 3 (–4) branches, almost invariably with 2 spreading; branch leaves not in straight lines; stem largely or wholly pink or red; stem leaves up to 2 times as long as wide, sharply triangular, at least in upper half, with a pinched, sharp tip . . . . . *S. subnitens* (p. 291)
  - Shoots green, green and red/pink, or mainly red/pink; shoots neatly organized, parallel sided; fascicles of 4–5 branches, mostly with 3 spreading; branch leaves in straight lines; stem green or green with pink patches; stem leaves rounded-triangular, sometimes almost equilaterally so . . . . . *S. quinquefarium* (p. 286)
- 8 ■ Shoots small to medium; crimson, rose-pink, green with pink patches or flecks, or more rarely all green; forming tussocks or dense hummocks (which can be conspicuous); capitula ±hemispherical; leaves of spreading branches not or scarcely in straight lines . . . . . *S. capillifolium* subsp. *capillifolium* (p. 288)
  - Shoots small to large; various colours; forming loose carpets or tussocks, never conspicuous and dense hummocks (though *S. capillifolium* subsp. *rubellum* can form soft hummocks); capitula flat-topped or slightly convex; leaves of spreading branches not to markedly in straight lines . . . . . 9
- 9 ■ Shoots medium to large; a mix of crimson and green, occasionally green with flecks of crimson or pink, or all red; capitula with a small, terminal bud, easily seen at ×10; stem leaf tip notched or narrowly fringed. . . . . *S. russowii* (p. 285)
  - Shoots small to medium; colour often a strong pink, sometimes green and pink; capitulum without a visible terminal bud at ×10; stem leaves entire at tip . . . . . 10
- 10 ■ Shoots medium; spreading branches just below capitula ±straight when viewed from above; leaves of spreading branches in straight lines, with leaves straight and mid-branch leaves ±long-pointed with narrow, tapering tips. Growing ±at water level in base-enriched flushes; often closely associated with *S. teres* and/or *S. contortum* . . . . . *S. warnstorffii* (p. 287)
  - Shoots small to medium; spreading branches just below capitula ±curved, often irregularly so; leaves of spreading branches partially to markedly in straight lines, with leaves ±turned downwards towards the tip, mid-branch leaves short-pointed and appearing ±blunt. On bogs, heathland, in open woodland, and above water level in base-enriched flushes. . . . . *S. capillifolium* subsp. *rubellum* (p. 288)

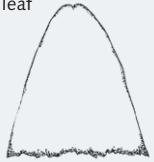


## Key 4

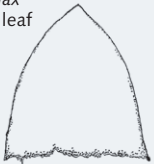
*Notes.* The three species in this key, *S. fallax*, *S. angustifolium* and *S. flexuosum*, (part of Section Cuspidata) were previously treated as three subspecies of *S. recurvum*, a species now known to occur only in the Azores in Europe. *S. fallax* is a very variable species. Typical *S. flexuosum* and *S. angustifolium* are quite different from each other, but each can look like *S. fallax*. However, occasional plants will be found that, while clearly one of these three species, show a mix of features, and identification in the field is impossible. There will remain a small number that cannot be named even with the aid of a microscope.

Terrestrial forms of *S. cuspidatum* (see tabular key on pp. 64–65 and species account on p. 302) look very different from the typical bog-pool form and can be mistaken for *S. fallax*.

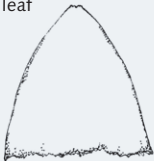
*S. flexuosum*  
stem leaf



*S. fallax*  
stem leaf



*S. angustifolium*  
stem leaf



- 1 ■ Stem leaves with  $\pm$ truncate and fringed tip, length greater than width; stem and base of branches without any pink; little differentiation between spreading and hanging branches; stem  $\pm$ visible through branches . . . . . *S. flexuosum* (p. 308)
- Stem leaves triangular, with either a 'pinched' or a rounded tip, length about equal to width; stem and base of branches often with some pink, except when shaded; spreading and hanging branches clearly differentiated . . . . . 2
- 2 ■ Shoots medium to large; capitula convex to  $\pm$ flat; leaves usually in straight lines along spreading branches; hanging and spreading branches roughly similar in length; stem leaves shortly pointed, with a 'pinched' apex (check several shoots) . . . . . *S. fallax* (p. 306)
- Shoots small to medium; capitula convex, sometimes markedly so, like pom-poms; leaves in straight lines in basal half of spreading branches or not in straight lines; hanging branches thin and trailing, markedly longer than spreading branches; stem leaves with rounded tip (but in situ can look deceptively pointed – check several shoots) . . . . . *S. angustifolium* (p. 307)