

A History of Recording Bog Mosses in Berkshire with selected Site Descriptions

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Summary

For a paper recently submitted for consideration to the *Journal of Bryology*, based on my dissertation for an MSc in Biological Recording from the University of Birmingham, I looked at the different methods of detecting change in species distribution over time in relation to bog mosses (*Sphagnum* spp.) in Vice County 22 (Berkshire).

In this paper I will give a brief overview of the history of recording bryophytes (mosses and liverworts) in Berkshire and go on to describe some of the sites I have surveyed, the *Sphagnum* species to be found there and any changes that have taken place over the known recorded history.

Introduction

Sphagnum records for Berkshire were collected from a range of sources for my dissertation, as shown in Table 1, including herbaria at *The University of Reading*, **RNG** and *The National Museum of Wales*, **NMW**; these tended to be from pre-1945 or shortly after and had only a site name for location. The use of herbarium and museum specimens as a source of historical information for education and research, as resources for taxonomic study and as a means of assessing changes in species distribution is well documented (McCarthy 1998, Shaffer *et al.* 1998, Winker 2004, Pyke & Ehrlich 2010, Godfrey 2011, Colla *et al.* 2012, Culley 2013, Lavoie 2013, Nelson *et al.* 2013) and has seen a significant increase in research in the last twenty years (Pyke & Ehrlich 2010) because “collections represent both spatially and temporally precise data, they can be used to reconstruct historical species ranges....” (Drew 2011, p.1250).

Table 1: The sources of *Sphagnum* records

Source	Type	No. of Records	Notes
British Bryological Society	Database	361	240 records could not be used because of no site name and only a hectad NGR.
Thames Valley Environmental Record Centre	Database	151	Most were already in the BBS dataset.
Dr Jeff Bates	Personal records	72	From Dr J.W. Bates field notes and BRC record cards from 1982-1994 surveys. These were in addition to records already held by the BBS.
National Museum of Wales, NMW	Herbarium	155	The BBS herbarium is stored at the NMW , Cardiff. None of these records had a recorder name but had good site notes and dates. Most were pre-1945.
University of Reading, RNG	Herbarium	117	Collected from a personal visit.
Peter Creed	Personal records	20	Records made from 2010-2011.
Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust	Database	10	From the Trust's database of biological records (Recorder).
Journal of Bryology	Site Report	9	Individual site reports, notably for Chawley Brick Pit.
Reports	Report	1	Other site reports. This is the survey for Shotover Wildlife of Chawley Brick Pit.
Author's recording	Field Record	68	

A History of Bryological Recording in Berkshire

There are 35 *Sphagnum* species found in the British Isles (Hill 2008), 18 of which have been recorded in Berkshire (Jones 1952), although only 14 of these would be regarded as relatively common. Appendix A lists these 18 species. Because of taxonomic change, using old records and herbarium records can present some difficulty. For example, *S. subsecundum* (Slender Cow-horn Bog-moss), as it is currently understood, has never been recorded in Berkshire and yet herbarium records do exist for this species. At the start of the 20th century the name *S. subsecundum* was used collectively for what we now understand as three different species: *S. denticulatum* (Cow-horn Bog-moss), *S. inundatum* (Lesser Cow-horn Bog-moss) and *S. subsecundum*. Likewise *S. recurvum* has been segregated into *S. fallax* (Flat-topped Bog-moss), *S. flexuosum* (Flexuous Bog-moss) and *S. angustifolium* (Fine Bog-moss).

Because of the low levels of rainfall, habitats where *Sphagnum* can thrive are unusual in Berkshire and are therefore of high conservation value because of their distinctive plant communities (Crawley 2005). The National Vegetation Classification (NVC) for Mires and Heaths (Rodwell 1992) describes the British mire communities, five of which can be found in Berkshire (Crawley 2005): M16 *Erica tetralix-Sphagnum compactum* wet heath, M21 *Narthecium ossifragum-Sphagnum papillosum* valley mire, M13 *Schoenus nigricans-Juncus subnodulosus* mire, M22 *Juncus subnodulosus-Cirsium palustre* fen meadow and M24 *Molinia caerulea-Cirsium dissectum* fen meadow. In addition *Sphagnum* has been recorded at woodland sites with acid flushes, such as Hurst Hill and Chawley Brick Pit Site of Special Scientific Interest (SSSI), at SP4704 (Jones 1986, Bates 1995, Porley 1996, Wright & Wright 2003, Wright 2011).

Prior to the publication of the first bryophyte flora of Berkshire there had been extensive recording of bryophytes in the county, under the influence of botanists at or associated with Oxford University and the University of Reading (Jones 1952, Bates 1995). G.C. Druce wrote floras of Berkshire (1897) and Oxfordshire (1886), amongst others, but he was not a bryologist and he relied heavily on the recording of Henry Boswell who wrote the chapter on mosses and liverworts in Druce's 1886 *Flora of Oxfordshire* which also contained references to bryophytes in Berkshire (Bates 1995).

Despite extensive recording of bryophytes in Berkshire up to 1936, much of it was piecemeal with little systematic effort (Bates 1995). Dr E.W. Jones (1952) used many existing sources of biological records and made extensive use of herbarium specimens to gather historic bryophyte records for Berkshire; he lists all the known collectors of records and the periods they were active in, and literature sources from which records were gathered, as well as the locations of important herbarium collections, mainly lodged at the Universities of Oxford and Reading. Jones also recorded extensively in the period 1936 to 1946 in Berkshire and Oxfordshire (Bates 1995). The collection of historic records is used as a comparison with the more recent records, collected between 1936 and 1952, to detect change (Jones 1952). Declines are highlighted in this way and explained as the result of agricultural activities (Jones 1952). The 23 species of *Sphagnum* that were recorded in Berkshire prior to 1952 are listed together with notes on localities in both Berkshire and Oxfordshire (Jones 1952). Taxonomic changes mean that this list should be reduced to 18 species.

The Flora of Berkshire (Bowen 1968) includes a chapter on bryophytes edited by Dr E.W. Jones; it lists the *Sphagnum* species with the sites where they may be found and who recorded them; a small amount of additional data was added to the 1952 list (Bates 1995).

A bryophyte flora of Berkshire was published in 1995 and covered the Vice County in a systematic way (Bates 1995). Recording at the site and quadrant level between 1982 and 1994 allowed the County to be fully recorded at a detailed enough level to reveal distribution patterns and to detect change. For the first time Dr Bates' flora attempted to detect changes in the bryophyte flora between pre 1982 records and post 1982 records. This flora describes the location and condition of the mires and fens found in Berkshire, including two communities, at Greenham Common (SU4964) and Caesar's Camp (SU8665), that have disappeared since Jones' 1952 flora. Wellington College Bog (SU8362) is described as the site with the greatest diversity for *Sphagnum* where 12 species could be found (Bates 1995). Individual valley mires are listed under the *S. magellanicum* (Magellanic Bog-moss) species account, because the species is considered "...indicative of conservation worthy mires" (Bates 1995, p.552). Quadrant distribution maps are reproduced for all 17 *Sphagnum* species recorded in Berkshire in 1995.

The next major publication was an updated flora of Berkshire (Crawley 2005) including a chapter on the Liverworts, Hornworts and Mosses of the Vice County written by Dr J.W. Bates. The same list of valley mire sites are listed under the *S. magellanicum* species account as "A characteristic species of the best remaining valley mires in the county" (Bates 2005, p.1212). These sites are: Longmoor Bog (SU76NE), Wellington College Bog (SU8362), Owlsmoor Bog (SU8463), Wildmoor Bottom (SU8462), Broadmoor Bottom (SU8562), Crowthorne Wood Bog (SU8565),

Mill Pond Bog (SU86NE), Sole Common Pond (SU4170) and Snelsmore Common (SU4570), the latter two in West Berkshire (Bates 2005).

Site Descriptions

As explained above there are many sites of interest in Berkshire and just some of them are described below. Table 2 shows a summary of the records found for each of the sites described, the sources of these records are various, as shown in Table 1. The 'Field Data' records were made by the author and a selection of these records was verified. For my dissertation, sites were selected for recording from across Berkshire based on an even geographical coverage and for their accessibility. There are many sites that could have been surveyed across the county, some are very well known and referred to above, but a selection of sites was chosen using the following criteria:

- Sites known to have a lot of Bog-moss species.
- Sites where only a few species have ever been recorded.
- Sites where no records have been made for over 50 years.

Table 2. *Sphagnum* species counts by site and period. Specimens were verified by Dr J. W. Bates and M. F. Godfrey.

Site & Monad	Pre 1982	1982 to 1994	Post 1994	Field Data (verified)	Last record
Decoy Heath (SU6163)	-	-	5	3 (0)	2011
Englemere Pond (SU9068)	2	2	-	5 (4)	1984
Heath Pool (SU8164)	3	-	-	3 (1)	1930
Inkpen Common (SU3864)	5	7	2	6 (1)	2010
Parsonage Moor (SU4699)	1	1	1	1 (1)	2010
Snelsmore Common (SU4670)	12	12	11	10 (5)	2010
Sole Common Pond (SU4170)	2	9	3	5 (2)	2010
Spout Pond (SU8063)	2	1	-	3 (3)	1 post 1930 record

Parsonage Moor (SU4699)

This is a Berkshire, Buckinghamshire and Oxfordshire (BBOWT) nature reserve and is adjacent to Cothill Fen National Nature Reserve (NNR), together forming the Cothill Fen Special Area of Conservation (SAC). The fen is a nationally rare habitat, a lowland calcareous fen, combining lime rich spring waters and peaty soils. This combination enables both plants that are calcicoles and plants that are calcifuges to exist. There are areas of reed bed, wet woodland and open water.

Bog mosses are calcifuges and the only *Sphagnum* species I found at Parsonage Moor was *S. subnitens* (Lustrous Bog-moss), although *S. papillosum* (Papillose Bog-moss) was recorded here in 1963 and small quantities of *S. palustre* (Blunt-leaved Bog-moss) and *S. fimbriatum* (Fringed Bog-moss) have been recorded in recent years. There are no other records for *S. papillosum*, and it is possible that this record is

actually *S. palustre* with which it is readily confused. The *Sphagnum* at Parsonage Moor is in small patches and can be quite hard to find.

There are several records for *S. palustre* at Cothill Fen between 1962 and 1991 and there are more recent records for both *S. subnitens* and *S. fimbriatum* in the alder-birch woodland at the western end of the site. Dr J. W. Bates *et al.* (recording for *A bryophyte flora of Berkshire* in 1993) found only *S. subnitens* at both Parsonage Moor and Cothill Fen. These records suggest that the site is stable, although it would be worth monitoring the extent of the *Sphagnum* patches to see if any changes are taking place across the SAC.

Sole Common Pond (SU4170)

This is a small BBOWT reserve consisting of a *Sphagnum* fringed pond, heath and wet woodland. I found no *Sphagnum* records prior to 1974, when two species were recorded. Dr J. W. Bates *et al.* (recording for *A bryophyte flora of Berkshire*) found eight species during a survey in 1987. I recorded five species over two visits in 2013. There are very large carpets of *Sphagnum* at this site around the pond and into the woodland, so it would seem possible that I missed some species, especially in the woodland area. On a return visit in 2014 I searched extensively in the woodland, and was unable to find the distinctive chunky wine-red species *S. magellanicum*, which had last been recorded in 1987. The extensive carpets of *Sphagnum* suggest that the site is stable in terms of the level of the water table with the possible loss of *S. magellanicum*. *S. capillifolium* (Acute-leaved Bog-moss) has not been recorded since 1987, but may have been overlooked, *S. inundatum* has only been recorded once (in 2010) and may have been overlooked in 2013 and 2014.



Figure 1. Sole Common Pond; the *Sphagnum* at this BBOWT reserve can be seen in the foreground on the edge of the pond amongst the grasses and rushes. Photo by J.Asher.

Englemere Pond (SU9068)

Englemere Pond is a SSSI and Local Nature Reserve (LNR) owned by The Crown Estate and managed by Bracknell Forest Council. It consists of a shallow acidic lake, alder carr, woodland and heathland with *Sphagnum* found in the carr, in woodland ditches and on the pool edge, submerged in some areas. Dr J.W. Bates recorded two *Sphagnum* species in 1984 and, during a visit in 2013 with the author, five species were recorded. Is this increase the result of concentrated effort looking for a single genus at a site, or a real effect of species range expansion? It is not possible to say what the case is here, because the effort put into previous surveys is not known, nor is the technique employed or the time taken on the site visit. It is well known that standardised survey techniques across two time periods will produce results that are more directly comparable (Prendergast *et al.* 1993, Gibbons *et al.* 1993, Rich 1998, Dennis *et al.* 1999, Botts *et al.* 2012, Hill 2012, Preston *et al.* 2012, Balmer *et al.* 2013) and without standard techniques being employed it is impossible to state why more species were found in 2013.

Inkpen Common (SU3864)

Many interesting heathland plants are to be found at this BBOWT reserve. The site also has areas of woodland and a small valley bog.

The *Sphagnum* is located on the eastern reserve, in and around the fenced off area towards the far end of the site, from the entrance at the parking area. A small stream runs across the bog and into woodland on the other side; there is a short boardwalk to aid access.

This is a well recorded site for bryophytes with many records for *Sphagnum* since 1941. Six species were recorded in 1985 over two visits, five species in 1992 and I recorded six species in late 2013. The six species recorded in 2013 were: *S. palustre*, *S. fallax*, *S. subnitens*, *S. capillifolium*, *S. inundatum* and *S. denticulatum* and all these species had been recorded previously. This pattern suggests the site is stable and remaining wet enough. The *Sphagnum* extends into the woodland, and can be found in extensive patches outside of the fenced area.



Figure 2. *Sphagnum capillifolium* ssp. *rubellum* Photo by P Creed

Decoy Heath (SU6163)

This BBOWT site comprises several shallow pools, wet and dry heath and woodland. It is well known for dragonflies and damselflies and has many interesting bryophytes. Access is not easy.

I found very little *Sphagnum* around the edges of the pools. It is in the woodland on the western part of the site where the largest patches are to be found. I found *S. palustre*, *S. subnitens* and *S. fallax* in patches adjacent to a damp gully and small stream formed from the run-off from the upper pond. I found no records prior to 2003 so it is hard to judge the history of the site. Other species have been recorded here, so there are possibly patches of *Sphagnum* I did not find.

Heath Pool (SU812641)

This site is part of Finchampstead Ridges and Simon's Wood owned by the National Trust, an area of wet woodland and lowland heath located high up on the ridge above the Blackwater River, between Crowthorne and Finchampstead. The pool itself can be found to the south of King's Mere.

I found no *Sphagnum* records post 1930 for this site, so it was interesting to see if there was any still present. The worn and busy footpath around the pool suggested I would be unlucky, but at the southern end of the pool, where the footpath veers away from the pond edge and away from the pool close to a small wooden bridge I found areas of *S. denticulatum*, *S. palustre* and *S. fallax*. These records suggest that the species had either been over-looked or the site not recorded in the intervening years, and that there had been no break in the presence of the species at the site, especially as *S. denticulatum* was recorded in 1916 and 1921 from records collected at **RNG**.

Snelsmore Common (SU455708)

This is a 100 hectare Country Park managed by BBOWT following a transfer of management responsibility in January 2014 as part of an agreement between West Berkshire Council, the landowners and the Trust. It is just three miles from Sole Common Pond and habitats include heathland, woodland and wet bog. Extensive carpets of *Sphagnum* can be found in the bogs at the south west end of the site surrounded by wet woodland. Thirteen species have been recorded here since 1905, Snelsmore having been well recorded since 1945. I recorded ten species over two visits in late 2013 and early 2014 and these were: *S. palustre*, *S. papillosum*, *S. subnitens*, *S. fallax*, *S. magellanicum*, *S. cuspidatum*, *S. tenellum*, *S. capillifolium*, *S. fimbriatum* and *S. denticulatum*. The three species I did not find were *S. inundatum*, *S. flexuosum* and *S. compactum* (Compact Bog-moss). The first two of these are difficult to find because of their similarity to other species (The Cow-horn Bog-mosses described earlier and *S. fallax* respectively) and *S. compactum* is hard to find because several *Sphagnum* species form dense mats and only a close inspection of the (minute) stem leaves differentiates this species from others with a similar habitat. It is certainly worth discovering the boggy areas of the site because many *Sphagnum* species can be found in a small area, alongside other typical vascular plant bog species, such as Cottongrass (*Eriophorum* spp.), Round-leaved Sundew (*Drosera rotundifolia*) and Bog Asphodel (*Narthecium ossifragum*).



Figure 3. *Sphagnum palustre* with *Polytrichum commune*. Photo by P Creed

Spout Pond (SU809631)

Like Heath Pool this site is also part of the National Trust owned Finchampstead Ridges. It is a small pond situated in woodland at the bottom of the steep valley side of The Ridges.

I recorded three species of *Sphagnum* in 2013, *S. palustre*, *S. fallax* and *S. denticulatum*; prior to that only one record had been made since 1930 (in 1986). This record was for *S. subnitens*, so for such a small site it would appear that quite a few species are present.



Figure 4. Spout Pond, a small *Sphagnum* fringed pool at the National Trust Finchampstead Ridges. Photo by A.Sanders

Conclusion

The sites described above are just some of the many places where Bog-mosses can be found in Berkshire. My dissertation compared several techniques for detecting change in species distribution over time, but perhaps the most interesting was the BSBI *Change Index* (Telfer *et al.* 2002), a statistical regression technique that results in a relative change index value for each species used in the comparison of data between two time periods and, because the index is a relative value, the effect of differences in recorder effort between the time periods are reduced.

Using this technique on bryophyte data for the periods 1982 to 1994 and post 1995, it was found that no *Sphagnum* species have significantly increased or declined across Berkshire. From the same model some bryophyte species did show a decline for example: *Plagiothecium denticulatum* (Dentated Silk-moss), *P. undulatum* (Waved Silk-moss) and *Pleurozium schreberi* (Red-stemmed Feather-moss). Some species showed an increase in range for example: *Barbula convoluta* (Lesser Bird's-claw Beard-moss), *Cryphaea heteromalla* (Lateral Cryphaea) and *Ulota phyllantha* (Frizzled Pincushion). What these changes indicate about the condition of habitats for bryophytes in the county is difficult to interpret, but the apparent stable position of Bog-mosses is encouraging, and may indicate that the sites where these species are found are being conserved and positively managed.

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Appendix A

The 18 *Sphagnum* species recorded in Vice County 22, along with the year of the most recent record.

<i>S. angustifolium</i>	Fine Bog-moss	1995
<i>S. capillifolium</i>	Acute-leaved Bog-moss	2014
<i>S. compactum</i>	Compact Bog-moss	2013
<i>S. cuspidatum</i>	Feathery Bog-moss	2013
<i>S. denticulatum</i>	Cow-horn Bog-moss	2014
<i>S. fallax</i>	Flat-topped Bog-moss	2014
<i>S. fimbriatum</i>	Fringed Bog-moss	2014
<i>S. flexuosum</i>	Flexuous Bog-moss	2008
<i>S. inundatum</i>	Lesser Cow-horn Bog-moss	2014
<i>S. magellanicum</i>	Magellanic Bog-moss	2014
<i>S. molle</i>	Blushing Bog-moss	1986
<i>S. palustre</i>	Blunt-leaved Bog-moss	2014
<i>S. papillosum</i>	Papillose Bog-moss	2013
<i>S. riparium</i>	Cleft Bog-moss	1971
<i>S. russowii</i>	Russow's Bog-moss	1983
<i>S. squarrosum</i>	Spiky Bog-moss	2013
<i>S. subnitens</i>	Lustrous Bog-moss	2014
<i>S. tenellum</i>	Soft Bog-moss	2013