

The Moss Year – 2021

Recorder activity returned to some semblance of normality in 2021, although the extended lockdown at the beginning of the year meant that it started slowly. This did, however, mean that bryologists could start to get to grips with new moss (and liverwort) names published in the 2020 checklist (Blockeel *et al.*, 2021a). At the end of the year, publication of a new census catalogue (Blockeel *et al.*, 2021b) consolidated these changes and newly bracketed many species/vice-county combinations.

Overall, in 2021 there were 310 additions and amendments to the census catalogue, excluding a transfer of all existing records of *Didymodon tophaceus* to its nominate subspecies *tophaceus*. This represents 117 more additions and amendments than in 2020, showing a genuinely increased collection effort across all countries. Some of the amendments were also the result of work by Des Callaghan and Tom Ottley, who reviewed the identification of

collections of several moss taxa in the BBSUK herbarium. These figures are summarised in Table 1 below.

The Barmouth field meeting in September was the first held by the society since 2019 and was well attended. However, it only generated eight new moss vice-county records for Merionethshire (vc 48), which is unsurprising given its proximity to Snowdonia and attractive bryological terrain.

Overall, the new records were distributed across 86 of the 153 British and Irish vice-counties and 59 individuals were involved in contributing them (as the first-named recorder on a voucher). Tom Blockeel and Sharon Pilkington each contributed 23 vouchers or amendments (excluding deletions), Rory Hodd 22, Matt Sutton 18, Sean O’Leary 15, David Long 14, Rory Whytock 12, Jonathan Sleath 11, Nick Hodgetts, Richard Lansdown and George Smith 10 each, Pete Martin 9, Liz Kungu 8, and Andrew Branson and Mags Crittenden 5 each.

Table 1. Analysis of amendments to the Census Catalogue for 2021.

	2021				2020			
	England	Wales	Scotland	Ireland	England	Wales	Scotland	Ireland
New entries	103	46	39	34	70	32	27	25
Debrackets*	17	1	16	18	18	7	4	8
Reinstated	-	-	-	-	-	-	-	-
Bracketings*	-	1	-	-	1	-	-	-
Deletions	17	8	6	4	-	-	1	-
Totals	137	56	61	56	89	39	32	33

*Debrackets are existing vice-county entries for which a post-1970 record has been vouched. Bracketings are existing entries for which the post-1970 records are unconfirmed, erroneous or older record(s) are known or thought to be valid. New records include persisting introductions.



△ Figure 1. *Bryoerythrophyllum campylocarpum*.
Sharon Pilkington

Additions and amendments to the British and Irish list

No sooner had the 2020 checklist been published than four new taxa were added to it.

Bryoerythrophyllum campylocarpum, found in Cardiganshire and Cork (Ottley *et al.*, 2021), is primarily a tropical and subtropical species and in Europe had only been confirmed from Portugal and Madeira. Its origins here are therefore unclear. *B. campylocarpum* grows in nondescript places (pockets of soil in stony woodland paths seem to be a particular favourite) and in the field resembles *Barbula unguiculata* or *Streblotrichum convolutum* (Fig. 1). It does, however, have very distinct basal cell areolation under the microscope.

Until very recently, *Didymodon tophaceus* has been entirely represented in Britain and Ireland by its nominate subspecies *tophaceus*. When Pete

Martin visited the small island of Lundy in 2021, he came across a form of *D. tophaceus* that struck him as different enough to seek an opinion from *Didymodon* expert Jan Kučera. Jan confirmed it as subsp. *sicculus*, first described from arid regions of Spain and new to Britain (Martin, 2021). This subspecies is likely to have a very restricted (likely southern coastal) distribution with us.

Ptychostomum touwii was found new to Britain in Cornwall (Callaghan & Bijlsma, 2021) shortly after it was described as a new species (Bijlsma *et al.*, 2020). Regrettably, its circumscription came too late to be included in David Holyoak's comprehensive monograph of the European Bryaceae. It is close to *Bryum* (*Ptychostomum*) *rubens* but differs in being a calcifuge and more likely to be found on less nutrient-rich sandy soils and loams.

Tortula pallida was reinstated after a somewhat chequered taxonomic history (Bosanquet, 2021). Known as *Pottia littoralis* until the 20th century, its habitat of semi-saline coastal habitats

is distinctive, as is its leaf shape. Subsequently, it was sunk into what is now *Tortula caucasica* (*T. modica*) and almost forgotten. Its distribution is not yet known but it may turn out to be frequent along our coastlines.

Following his review of *Racomitrium obtusum* and its allies (Ottley, 2021), Tom Ottley continued to examine existing BBSUK herbarium specimens of *R. heterostichum* s. lat., redetermining many of them as *R. obtusum* and other *Racomitrium* species. There has clearly been considerable confusion about this group in the past. Tom would like to thank Katherine Slade and staff at the National Museum Wales for arranging the loan of herbarium material in what were clearly very difficult working conditions caused by COVID restrictions. It is likely that there will be more voucher redeterminations of this group in the future.

Des Callaghan reviewed herbarium material of *Weissia longifolia* and redetermined some plants as *Weissia wilsonii*, which is clearly a more common plant than previously thought. See Callaghan *et al.* (2019) for the current circumscription of species in *Weissia* section *Astomum* which includes species with a short seta, cleistocarpic capsule (mostly) and well-differentiated perichaetial leaves. See also Des Callaghan's note in this issue on *W. wilsonii* (p. 24).

Selected highlights

There was a welcome increase in recording activity in Scotland, with vouchers processed for 18 different vice-counties. *Sphagnum medium* was the most frequently submitted species, filling in gaps left by the demise of *S. magellanicum*.

Species new to Scotland are not found very often. However, less than a week after leaving the autumn BBS meeting at Plas Caerdeon, where he familiarised himself with *Bryoerythrophyllum*

campylocarpum, David Long found the first Scottish population of that moss on Skye.

Liz Kungu, Tristan ap Rheinallt and Rory Whytock were also very active, the latter's find of *Ditrichum lineare* on Arran being a particularly welcome gap-filler. The prize for the most northerly find of the year goes to Sean O'Leary's *Pseudocrossidium revolutum*, which he collected from a garden wall in Weisdale, Shetland. Though a familiar species in the south, this moss is rather rare in northern Scotland.

In Ireland, Jo Denyer, Rory Hodd and George Smith generated numerous vice-county records between them. One of the most exciting things about Ireland (at least from the perspective of a bryologist living in England) is that it remains relatively easy to find multiple new (or recent) species in many vice-counties because of the lack of actively recording bryologists resident there. Rory has become a specialist in sniffing out rich sites and collected no fewer than 11 moss NCRs in Glenasmole, Co. Dublin, which is relatively well-recorded as Irish vice-counties go. Two particularly good finds of his in the poetically named Cataract of the Rowan Tree were *Tetradontium brownianum* and *Ulotia drummondii*. Later in the year, Rory and Jo Denyer surveyed a limestone (cement) quarry in Co. Limerick together, finding *Gymnostomum viridulum*, *Thuidium assimile* and three other NCRs as a result. George Smith's survey of Abbeyleix Bog in Co. Leix generated no fewer than 6 NCRs and mire surveys elsewhere in Ireland produced two more records of *Sphagnum divinum*, which is seemingly not too uncommon in the peatlands of the Republic.

In the last couple of years, *Dicranella howei* (Fig. 2) has become familiar to many bryologists, especially Jonathan Sleath who made no fewer than 5 NCRs for it in 2021. Nick Hodgett's find in Co. Kildare is a very welcome extension of its



△ Figure 2. *Dicranella howei* was confirmed from 11 more English vice-counties and as new to Ireland.

Jonathan Sleath

range to the Republic of Ireland.

In south-west Wales, Matt Sutton continued to make some outstanding discoveries; one of the best has to be *Cynodontium tenellum*, in an old slate quarry in Pembrokeshire. This rarity has a very restricted range and had not previously been found outside Scotland, where the Grampian mountains are its heartland. Matt, who has developed a remarkably keen eye for very small and cryptic species, also found *Didymodon tomaculosus* new to Carmarthenshire and *Bryum dyffrynense* and *B. gemmilucens* both from Pembrokeshire, the latter new to Wales in the Castlemartin Ranges. Tom Ottley also collected *B. gemmilucens* new to Cardiganshire from a forest track later in the year. Do these finds represent a genuine range expansion to the west for this species or has it perhaps been overlooked owing to its small size and similarity to the ubiquitous *B. dichotomum*?

In Merionethshire, the first national-level

field meeting for two years took place at Plas Caerdeon, near Barmouth, in September. It was well-attended despite the ever-present concerns about COVID and everyone who came was determined to make up for lost time bryophyte-spotting with like-minded friends. On the very first morning, *Bryoerythrophyllum campylocarpum* was collected by Matt Stribley and others from a woodland at Cutiau, new to Merionethshire. During the week this moss was found in several other places, including the wooded grounds of Plas Caerdeon itself. Tom Blockeel spent the week before the meeting on holiday with his wife in the Conwy Valley and found *B. campylocarpum* new to two adjacent vice-counties at Bodnant Gardens and Swallow Falls.

Other notable NCRs from the Barmouth meeting included *Sematophyllum substrumulosum*, found by Matt Stribley, *Grimmia longirostris*, spotted by Gordon Rothero and Sharon

Pilkington's *Gymnostomum viridulum*.

In Denbighshire, Neil Sanderson found *Sphagnum divinum* during a visit to Bettisfield Moss, a raised mire, a significant find because of its scarcity in Wales. Interestingly, *Sphagnum medium* grows in the same site.

In Montgomeryshire, Sam Bosanquet's *Daltonia splachnoides* on willow by Afon Caws extended this highly oceanic species' known range in Wales to six southern and western vice-counties. It is always worth spending some time searching for this distinctive-looking but elusive pleurocarp in very humid places associated with conifer plantations – often where the midges form the densest swarms.

In England, Tom Blockeel once again demonstrated that it is possible to add multiple new taxa to a well-recorded vice-county list. In Derbyshire, his efforts yielded no fewer than 7 NCRs, including a remarkable find of *Campylopus subulatus* near Buxton. As a calcifuge, *C. subulatus* avoids limestone, but Tom found it in a place where the soil was probably leached.

When the BBS summer Jura meeting was postponed, Claire Halpin, Sean O'Leary and Sharon Pilkington decided to go somewhere – anywhere – and bryologise together anyway. Sean rented a spacious house near Masham, North Yorkshire, and it was a productive and enjoyable week. Even so, two vice-county records for *Orthotrichum columbicum* (Fig. 3) and the discovery of a substantial population of the rare *O. pallens* were most unexpected in June.

In the Midlands, Mags Crittenden found two new mosses – *Pogonatum urnigerum* and *Pleuridium subulatum* – in Nottinghamshire, no mean achievement in a county not known for its modern bryodiversity. Mags' efforts show that interesting species can persist (or recolonise) in even the most modified of vice-counties as long as small pockets of suitable habitat remain.

Richard Lansdown spent a lot of time surveying poorly recorded parts of Gloucestershire. He found populations of a number of rarities as a result, including *Entosthodon pulchellus* at Cleeve Common and *Myrinia pulvinata* near the River Severn. On the Severn Estuary in W. Gloucestershire, Des Callaghan was the first person to vouch *Tortula pallida*, whilst further south still, Andrew Branson found the same species new to Somerset at Steart. Elsewhere in West Gloucestershire, Pete Martin found the scarce *Hygroamblystegium humile* in an unappealing muddy arable field near Tetbury (Fig. 4). This rather nondescript species loves

▽ Figure 3. *Orthotrichum columbicum* in North-west Yorkshire. Sharon Pilkington





△ Figure 4. A muddy field near Tetbury, which was the site for *Hygroamblystegium humile*. Pete Martin



△ Figure 5. *Racomitrium aciculare*, *R. heterostichum* s. str. and *Hedwigia stellata* all new to Cambridgeshire. Paul Rule

wet clay and is common in parts of the Somerset Levels, especially at the poached edges of rhynes (wet ditches). Are some of us overlooking it on farmland?

Pterigynandrum filiforme is familiar to Scottish bryologists as a species of lochside boulders and base-rich crags and rocks. It has previously been found in eastern England on tree bark, where it probably colonised from wind-borne spores from continental Europe. Sean O'Leary's outstanding recent find of *P. filiforme* on the trunk of a fallen Ash *Fraxinus excelsior* near High Wycombe in Buckinghamshire suggests that more of this species is to be found in the south and east. In another High Wycombe wood, Sean also found *Bartramia ithyphylla*, a very welcome record of a moss that is very rare in southern England.

In Cambridge, Chris Preston thought he was safely distanced from any *Racomitrium* habitat once he returned home from the Barmouth meeting. However, whilst recording around the Cambridge Science Park, his exciting discoveries of *Racomitrium aciculare*, *R. heterostichum* s. str. and *Hedwigia stellata* new to Cambridgeshire (Fig. 5) were only tempered by the fact that they had been introduced on their boulder habitat during landscaping.

Antitrichia curtipendula is most familiar to bryologists as a moss of upland areas, especially Scotland. The majority of its southern and eastern populations were sadly lost over a century ago, probably to sulphur dioxide pollution. There have been signs of recovery in recent years and therefore Jonathan Sleath's discovery of a population in a wood near Alton, N. Hampshire, is not altogether unexpected, though no less exciting for that. Jonathan also found *Grimmia orbicularis* on a wall in central Winchester, showing that some rarities can live in highly urbanised areas. Like a number of other species today, this moss occupies two distinct



△ Figure 6. *Entosthodon mouretii* at maturity in Cheddar Gorge. Sharon Pilkington

habitat niches – on natural limestone exposures (often near the sea) and on weathered concrete, such as the walls of disused china clay dries in Cornwall and active military small-arms firing ranges in Wiltshire.

In southern Somerset, a remote flushedcombe near Simonsbath on Exmoor produced an outstanding find of *Bryum riparium* for Andrew Branson. This is the first record of this species in south-west England and extends its range a significant distance southward. An earlier survey nearby produced *Hamatocaulis vernicosus* new to the same vice-county and there have been a number of other recent important bryological discoveries from flushes in the same valley complex. High Exmoor is now known to have some base-rich flush systems of high ecological value that have been more or less overlooked in the past, and it is to be hoped that their ecological importance will at last be recognised.

Entosthodon mouretii is little-known by many British and Irish bryologists as its discovery

in Wales (Bosanquet, 2012) came too late to include it in either Smith's flora or the BBS Field Guide. During a visit to Cheddar Gorge in April, Sharon Pilkington collected *E. mouretii* new to Somerset from thin soils over limestone outcrops (Fig. 6). With its symmetrical capsule and excurrent leaf nerve, it was evidently not *E. mühlenbergii* or *E. pulchellus*, both of which are found in the area. This charming little moss certainly deserves to be better known by the current generation of bryologists.

New vice-county records and amendments

Vouchers are deposited in the BBS herbarium (BBSUK) unless stated otherwise; codes for other herbaria cited are the National Botanic Garden, Glasnevin, Dublin (DBN) and the Royal Botanic Garden, Edinburgh (E). The symbol † indicates a persisting introduction. Records were made in 2021 unless indicated otherwise.

1.2. *Sphagnum compactum*. H19: on old cutover bog, close to drain, 90 m alt., Coolree, Prosperous, N80782801, M. Eakin.

- 1.7. *Sphagnum medium*. 2:** grazed mire, Dozmary Pool, SX19247431, D.A. Callaghan; **48:** water running from calcareous flush on cliffs into a pool, at edge of pool, Dduallt, SH812277, R. Martin with M. Lawley, A. Biddle, A. Stevenson & A. McLay, conf. M.O. Hill; **69:** bog, Roudsea Nature Reserve, SD3382, J. Brockbank; **70:** Brantrake Moss, SD1598, 2020, J. Brockbank, conf. J. O'Reilly & M.O. Hill; **72:** moorland with leggy heather, 180 m alt., Tarras Water Reserve, above Ringan's Well, Langholm, NY3879183664, E.M. Kungu, with C. Miles, V. Heppel, E.J. Sadler & B. Merritt, (E); **78:** among sparse *Calluna* N of Gameshope Loch, 575 m alt., Upper Gameshope, Talla & Gameshope Border Forest Trust Reserve, NT13071656, E.M. Kungu, D.G. Long & D. Bell (E); **80:** raised mire; in wet hollows, 240 m alt., East side of Threepwood Moss, NT51914266, D.G. Long & P.S. Lusby 47189 (E); **87:** lowland raised bog towards the western margin, 15 m alt., Flanders Moss, NS6212698188, E.M. Kungu & J. Smith (E); **106:** lawn in mire, 175 m alt., Allt na Feithe Corraich, Achilty, NH412575, 2020, G.P. Rothero 2020089, conf. M.O. Hill; **110:** edge of lochan in blanket mire, 98 m alt., Creagan an Fheidh, Abhainn Lacasdail, Lewis, NB39363637, T. ap Rheinallt 110/21/5, conf. M.O. Hill; **H15:** on wet blanket bog, Derrygoolin South, R691927, R.L. Hodd; **H16:** blanket mire: in wet *Sphagnum*-dominated hollow, 30 m alt., Derrigimlagh Townland, near Loughanillaun, L656466, D.G. Long 47208 (E); **H23:** raised bog, Garriskil Bog, N3550768244, G.F. Smith 2199006 (DBN).
- 1.8. *Sphagnum divinum*. 50:** on raised bog peat, Bettisfield Moss, SJ4791335390, N.A. Sanderson 59, conf. M.O. Hill; **64:** mire in unplanted gap in conifer plantation, Stainburn Forest, SE22065167, G. Haycock, conf. M.O. Hill; **H23:** cutover raised bog, Garriskil Bog, N3597266578, G.F. Smith R00067904009 (DBN); **H30:** cutover bog, Killyconny Bog, N6762881956, G.F. Smith 2199005 (DBN).
- 1.11. *Sphagnum fimbriatum*. H21:** at edge of flush, Upper Glenasmole, O117194, R.L. Hodd.
- 1.12. *Sphagnum girgensohnii*. H21:** in hummock beside flush, Upper Glenasmole, O117194, R.L. Hodd.
- 1.15. *Sphagnum warnstorffii*. H20:** locally frequent in transition mire, 190 m alt., Ballinceddan Lower, S9743391712, J. Denyer, N. Lockhart & K. Duff.
- 1.16. *Sphagnum capillifolium* s. str. 5:** on flushed bank with *S. palustre* and *S. fallax*, 322 m alt., Rams Combe near Exford, SS8143840533, A.J.P. Branson; **95:** blanket bog, 420 m alt., Dirdhu, NJ0820, R.T. Whytock; **H15:** on wet blanket bog, Derrygoolin South, R689926, R.L. Hodd.
- 1.18. *Sphagnum fuscum* s. str. 105:** *Calluna* slope, in large hummock, 430 m alt., Beinn Eighe NNR, Green Pastures, south slope of Meall a' Ghiubhais, NG97776269, D.G. Long & D. Bell 47163.
- 1.23. *Sphagnum subsecundum*. H20:** locally frequent in transition mire, 190 m alt., Ballinceddan Lower, S9746091676, J. Denyer, N. Lockhart & K. Duff.
- 1.31. *Sphagnum balticum*. Bracket 46:** the voucher from Cors Craig y Bwlch is *S. fallax*, det. D.A. Callaghan; the only confirmed specimen is now Cors Tregaron in 1969; delete **59:** the vouchers NMW.15.54.78 and NMW.25.152.14848 both belong to *S. obtusum*, det. D.A. Callaghan.
- 1.34. *Sphagnum flexuosum*. 65:** in wet area by stream, Grimes Gill, SE13637831, S.V. O'Leary, C. Halpin & S.L. Pilkington.
- 1.35. *Sphagnum angustifolium*. 65:** on flushed bank by stream, 240 m alt., below Cautley Spout, Howgill Fells, SD68359737, T.L. Blockeel 50/120, conf. M.O. Hill; **H20:** frequent in poor fen and transition mire area, 190 m alt., Ballinceddan Lower, S9756491562, J. Denyer, N. Lockhart & K. Duff.
- 2.2.a. *Andreaea rupestris* var. *rupestris*. 2:** on boulder bank in disused china clay pit, 225 m alt., Penhale Pit, SX0124555810, D.A. Callaghan.
- 2.6.a. *Andreaea rothii* subsp. *rothii*. 3:** granite tor, 305 m alt., Bench Tor, SX69157163, S.L. Pilkington 21041; **72:** steep-sided stream valley, on dry rocks under *Calluna*, 370 m alt., Carrifran Wildwood, tributary stream below Carrifran Gans, NT15221371, D.G. Long & D. Bell 47042.
- 5.1. *Tetradontium brownianum*. H21:** in dark overhang by river, Cataract of the Rowan Tree, Glenasmole, O1175619393, R.L. Hodd.
- 8.1. *Polytrichastrum alpinum*. 5:** on wall by stream, 325 m alt., Oareford: Weir Water, SS830460, S.L. Pilkington; **H9:** on wall top, Lecarrow Lower, R593855, R.L. Hodd, P. O'Brien & H. Mulcahy.
- 9.1. *Pogonatum nanum*. 38:** sandy soil, south-east facing bank in heathy woodland ride, 85 m alt., Coughton Park, SP06456083, S.G. Macvie.
- 9.3. *Pogonatum urnigerum*. 56:** exposed mineral

soil at edge of previous coal stocking yard on spoil, Rufford Colliery recreated lowland heathland, SK59235964, M. Crittenden & T.L. Blockeel.

10.1. *Polytrichum longisetum*. 110: top of flat dry rock at edge of moorland loch, 73 m alt., Loch na Ba Riabhaich, near Calbost, Lewis, NB40121780, T. ap Rheinallt 110/21/30.

10.4. *Polytrichum perigoniale*. 58: bare ground at edge of unsurfaced stony track on steep slope, Errwood, Goyt Valley, SK00357489, T.L. Blockeel 50/127; **65:** in thin turf of open bank of stream gully, 260 m alt., Cautley Spout, Howgill Fells, SD68319742, T.L. Blockeel 50/113; **73:** edge of bank to burn below bridge, 100 m alt., Buchan Burn, west bank, NX41778039, G.P. Rothero, E.M. Kungu, E. Sadler & V. Heppel (E); **75:** along edge of track, 320 m alt., SE slope of Goodman's Cairn, NX1374277245, 2018, E.M. Kungu (E); **81:** conifer plantation: on gravelly track margin, 345 m alt., near Trodlin Burn, Harecleugh Forest, Lammermuir Hills, NT62365313, D.G. Long 47295 (E).

14.1. *Encalypta streptocarpa*. 74: on old mortar on wall, 104 m alt., Knockishee, NX2530359675, R.T. Whytock.

16.2. *Entosthodon pulchellus*. 33: bare soil in the entrance to an active rabbit burrow beside the track, 286 m alt., Cleeve Common, SO9877526222, R.V. Lansdown.

16.5. *Entosthodon mouretii*. 6: on broken anthill over Carboniferous limestone exposure, 250 m alt., Cheddar Head, ST49435296, S.L. Pilkington 21042, conf. S.D.S. Bosanquet.

21.1. *Flexitrichum flexicaule*. 45: edge of wet slack, Brownslade Burrows, SR89589843, M.D. Sutton.

22.1. *Hymenoloma crispulum*. 110: damp vertical cliff, 174 m alt., Cadha Cleit, Loch Seaforth, Lewis, NB26681520, 2014, T. ap Rheinallt, conf. G.P. Rothero.

26.1. *Campylopus subulatus*. 11: forestry track in beech woodland, 100 m alt., Anses Wood, New Forest, SU22891242, J.A. Norton; **57:** soil gaps in turf, probably leached, over limestone, Anthony Hill, Buxton, SK04587056, T.L. Blockeel 50/072; **78:** on path formed from abandoned rail track, 280 m alt., Leadburn Community Woodland, Dolphinton Way, Leadburn, NT23375459, E.M. Kungu (E).

26.5. *Campylopus pyriformis*. H14: bare peat, bog



△ Figure 7. *Fissidens bryoides* var. *caespitans* in the New Forest, vc 11. John Norton

woodland, Abbeyleix Bog, S4382, G.F. Smith 2110001 (DBN).

29.2. *Dichodontium flavescens*. H21: on riverside rocks, Cataract of the Rowan Tree, Glenasmole, O116195, R.L. Hodd.

31.4. *Dicranella subulata*. 85: bare soil in hollow on grassy slope, 326 m alt., Craigen Gaw, Lomond Hills, NO20550718, 2016, T. ap Rheinallt, conf. G.P. Rothero.

31.6. *Dicranella howei*. 11: on friable chalky soil in disused chalk quarry, Bunstead Lane, Hursley, SU43622552, J.D. Sleath; **12:** on chalk bank beneath trees, S-facing chalk slope, Magdalen Hill Down, Winchester, SU50132928, J.D. Sleath; **20:** on chalky bank by track, Aldbury, SP96901280, J.D. Sleath; **22:** on chalky soil beside path, Uffington White Horse, SU30168673, J.D. Sleath; **23:** on heap of chalky soil in field, Aston Rowant NNR, SU72219673, J.D. Sleath; **24:** chalky soil in field, Chalkpit Wood, SU791856, S.V. O'Leary; **28:** grassy bank running through NWT reserve, Weeting Heath, nr Thetford, TL75778942, C. Halpin; **29:** calcareous soil, 20 m alt., 2 Spinney Drive, Great Shelford, TL463518, 1984, N.G. Hodgetts 155; **31:** calcareous bare earth, 20 m alt., Warboys railway cutting, TL315815, 1985, N.G. Hodgetts 494; **33:** bare ground on west-facing slope,

- Cleeve Cloud, Cleeve Common, SO9840825513, R.V. Lansdown; **34**: pathside bank, Brimscombe Wood, Ozleworth Bottom, ST8000893346, 2016, P. Martin; **H19**: skeletal soil in calcareous grassland, 105 m alt., The Curragh, north of Donnelly's Hollow, N80031185, N.G. Hodgetts 11203.
- 31.9. *Dicranella cerviculata*. 34**: bare peat left by conservation work following clear-fell of conifer plantation, Crabtree Hill, SO6346513187, R.V. Lansdown.
- 32.1. *Fissidens viridulus*. 97**: wet rock face by toilet block, 10 m alt., Ardtornish, NM70344753, S.D.S. Bosanquet. First found by J. Hughes and determined by M.O. Hill.
- 32.6.a. *Fissidens bryoides* var. *caespitans*. 11**: tree-lined stream, 85 m alt., Dockens Water, New Forest, SU228126, J.A. Norton (Fig. 7).
- 32.12. *Fissidens celticus*. 11**: on steep clay bank beside stream, Dockens Water, Anses Wood, SU22841266, J.D. Sleath.
- 32.20. *Fissidens fontanus*. 5**: on sluice, western side of River Yeo, 5 m alt., Pibsbury: Ablake Clyse, ST44102612, S.L. Pilkington 21121; **6**: on sluice, eastern side of River Yeo, 6 m alt., Pibsbury: Ablake Clyse, ST44122612, S.L. Pilkington 21122. The vice-county boundary is the middle of the river.
- 34.6. *Dicranum majus*. Delete 29**: the record by Richard Relhan in Eversden Wood in 1817 has no supporting voucher and considered to be a likely misidentification following a review of historical records for the Cambridgeshire flora by M.O Hill and C.D. Preston.
- 34.10. *Dicranum flexicaule*. 88**: boulder-filled hollow on boulder slope, on top of boulder, 975 m alt., Ben Lawers, Craig Loigste, below SW cliffs, NN63294106, D.G. Long & D. Bell 47139.
- 37.3. *Cynodontium jenneri*. 45**: under overhang on dry/partly dripping crag in woodland, Ty Canol, SN0914537063, M.D. Sutton.
- 37.6. *Cynodontium tenellum*. 45**: dry, east-facing base of worked face in old slate quarry, Rosebush Quarry, SN0787729928, M.D. Sutton.
- 46.1. *Pleuridium acuminatum*. 29**: three separate small patches on fresh graves and other disturbed, very sandy soil (Woburn Sands), Gamlingay Cemetery, TL23945213, J. Hughes & C.D. Preston, the specimen from grave of Charles C. Bedford; **110**: soil on steep stony slope in ravine, 137 m alt., Abhainn a' Mhuil, Aline, Lewis, NB19081264, T. ap Rheinalt 110/21/23.
- 46.2. *Pleuridium subulatum*. 56**: edge of wet track on soil overlying Pennine Middle Coal Measures, Old Moor Wood, Strelley, SK4986842057, M. Crittenden.
- 49.1. *Ditrichum pusillum*. 4**: in fallow field, 190 m alt., Cheldon, Pouncers Cross, SS74171133, 7 September 2005, N.F. Stewart, conf. M. Pool; delete **39**: the voucher from Gorse Bank, SJ781118 C2004.007.238 is *Dicranella staphylina*, det. D.A. Callaghan; **41**: acidic stone track, north of Cae'r Bryn near Neath, SS78239710, M.D. Sutton; **45**: edge of shaley track through young woodland, with *Didymodon icmadophilus* and *Dicranella subulata*, Coed Llwyn-drain, Crymch, SN1654131437, M.D. Sutton.
- 49.3. *Ditrichum lineare*. 65**: with *Nardia scalaris* and *Diplophyllum albicans* on gritty soil on open bank of stream gully, 250 m alt., Cautley Spout, Howgill Fells, SD68319740, T.L. Blockeel 50/112; **100**: 730 m alt., Goat Fell, Arran, NR994415, 2020, R.T. Whytock.
- 49.5. *Ditrichum heteromallum*. 6**: grazed and poached sandstone bank in field, 80 m alt., near Clapton-in-Gordano, ST47467351, S.L. Pilkington 21124.
- 54.6.a. *Weissia brachycarpa* var. *brachycarpa*. 33**: vertical face of rabbit hole in scrub on acid ground, 269 m alt., Cleeve Common, SO9933427088, R.V. Lansdown.
- 54.7. *Weissia squarrosa*. 5**: on wet clay by footpath, Wellington Castle Fields NR, ST13971744, A.J.P. Branson; **6**: closely pony-grazed clay paddock, 30 m alt., Launcherley, ST55204387, S.L. Pilkington 21031, conf. D.A. Callaghan.
- 54.8. *Weissia rostellata*. 47**: stubble, cornfield, Lower House Farm, Arddleen, SJ254145, M. Lawley, conf. D.A. Callaghan.
- 54.9. *Weissia wilsonii*. 6**: on eroded calcareous clay at bottom of slope, 70 m alt., Collard Hill, Street, ST48583428, 2016, S.L. Pilkington 16011, det. T.L. Blockeel, conf. D.A. Callaghan; **22** new in (): field by Black Gate Lane, Tubney, SU49, 1945, Unknown recorder, C96.19.839, det. D.A. Callaghan, previously accepted as *W. longifolia* var. *longifolia*; **41**: made ground, clay, edge of woodland, Coed Cadwgan, Cefn Mably, St. Mellons, ST208844, 1981, G.W. Garlick, voucher C.88.29.1212, det. D.A. Callaghan,

- previously accepted as *W. longifolia* var. *longifolia*; **49**: infrequently dug rose bed, Treborth Botanic Garden, SH552711, 1975, J.G. Duckett, voucher C2001.019.431, det. D.A. Callaghan, previously accepted as *W. longifolia* var. *longifolia*; **57**: on soil on broken ground on Magnesian Limestone, Poulter Country Park, Nether Langwith, SK524704, 2004, T.L. Blockeel 33/017, conf. D.A. Callaghan.
- 54.12. *Weissia longifolia* s. str.** All deletions are redetermined by D.A. Callaghan. Delete **6**: C2001.019.453 (Butleigh, 1965) and C89.19.1813, (Wincanton, ST62, 1969); both are *W. wilsonii*; delete **15**: C.2001.019.450 (Ramsgate, TL383661, 1992); this is *W. angustifolia*; delete **28**: C.89.19.1814 (East Wretham Heath, TL913886, 2006) this is *W. angustifolia*; **34**: bare soil on grave, Tibburton Church, SO7568221903, R.V. Lansdown; delete **49**: C.2001.019.431 (Treborth, SH552711, 1975) and C2010.030.2595 (Treborth Botanic Garden, 1975) both are *W. wilsonii*.
- 54.13. *Weissia angustifolia*.** Delete **57**: the voucher from Little Matlock, Pleasley Vale SK530652, Blockeel & Pearman, 2002 has been re-examined by T.L. Blockeel in the light of the revision by Callaghan *et al.* (2019), but the capsules are too immature for certain identification.
- 57.2. *Tortella nitida*. 105**: calcareous grassy slopes on fucoid beds, in crevice of boulder, 500 m alt., Beinn Eighe NNR, Green Pastures, south slope of Meall a' Ghiubhais, NG97816284, D.G. Long & D. Bell 47157.
- 57.4. *Tortella squarrosa*. 7**: well-grazed unimproved limestone grassland on a steep south-facing slope, 105 m alt., West Yatton Down, ST85417605, S.L. Pilkington & A.J.P. Branson 21011.
- 57.5. *Tortella tortuosa*. 74**: rocky area in flush at source of un-named burn draining into Cruise Burn, 160 m alt., Kilhern Moss, NX1946262410, 2018, E.M. Kungu (E).
- 57.10. *Tortella fasciculata*. 73**: on base-rich boulder, 508 m alt., Lumps of Garryhorn, NX5223692134, R.T. Whytock.
- 58.1.a. *Chionoloma tenuirostre* var. *tenuirostre*. 3**: rock in small stream, 3 m alt., Lustleigh Cleave, SX76388116, S.L. Pilkington 21111; **49**: on rock in the river, Afon Ddu, Dolgarrog, SH77426619, C. Halpin & Philippa Thompson; **57**: in thin layer of gritty soil on gritstone boulders by stream, 165 m alt., Kettle Wood, Harper Lees, near Hathersage, SK24008030, T.L. Blockeel; **65**: 490 m alt., Fox Earths Gill, Cronkley Fell, NY8359928554, 2016, J. O'Reilly; **73**: on sandy soil at edge of stream, with *Diplophyllum albicans*, 170 m alt., Caldons Burn, W bank, Glen Trool woods, NX407786, E.M. Kungu (E).
- 58.1.b. *Chionoloma tenuirostre* var. *holtii*. 2**: rocks near waterfall, 200 m alt., Draynes Wood, Golitha Falls, SX22356863, S.L. Pilkington 21052; **49**: wet rocks facing NW, 240 m alt., Cwm Glas Crafnant, SH73476003, Philippa Thompson; **H21**: on sloping rocks by river, Cataract of the Rowan Tree, Glenasmole, O119192, R.L. Hodd.
- 62.1. *Gymnostomum viridulum*. 33**: thin soil over rock in quarry, Swift's Hill, near Stroud, SO8776606777, P. Martin; **48**: north-facing mortar of footbridge footings, Afon Lliw, SH83133220, S.L. Pilkington 21091; **H8**: calcareous soil in quarry (edge), 20 m alt., Irish Cement Quarry, Castlemungret, R5302854584, J.L. Denyer & R.L. Hodd, conf. R.L. Hodd.
- 65.6. *Ephemerum serratum*. 95**: in arable field, 200 m alt., Inverallen House, by River Spey, NJ0266526370, R.T. Whytock.
- 67.2. *Pseudocrossidium revolutum*. 112**: on stone wall of garden, Kergord House, Weisdale, HU395542, 2020, S.V. O'Leary.
- 68.3A. *Bryoerythrophyllum campylocarpum*. 48**: on soil in rocky track in woodland, Cutiau, SH633175, S.L. Pilkington; **49**: soil pocket among stone chippings on woodland path, west of Swallow Falls, near Betws-y-Coed, SH762577, T.L. Blockeel 50/132; **50**: on gravelly soil at edge of path in landscaped garden, Bodnant Garden, SH797721, T.L. Blockeel 50/136; **104**: on semi-shaded track, margin of mature mixed woodland, 20 m alt., Isle of Skye, Sleat Peninsula, woods NE of Armadale Castle, NG64490520, D.G. Long 47264, conf. T.L. Blockeel (E).
- 70.1.b. *Streblotrichum convolutum* var. *commutatum*. 48**: mortared crevice of wall, Pont y Llyn-du, near Bronaber, SH731305, D.J. Scott; **48**: steep-sided wooded valley, on limy bridge parapet, 110 m alt., Afon Wen valley, NE of Tyn-y-Groes, north of Dolgellau, SH74622452, D.G. Long 47229 (E).
- 72.4. *Didymodon fallax*. H14**: earth bank by track through wet willow woodland, Abbeyleix Bog, S4383, G.F. Smith 2103023 (DBN).

- 72.7. *Didymodon tophaceus*.** Following the discovery of *D. tophaceus* subsp. *sicculus* new to Britain (Martin, 2021), all existing British and Irish vouchers of *D. tophaceus* should be transferred to subspecies *tophaceus*. See below.
- 72.7.a. *Didymodon tophaceus* subsp. *tophaceus*.** Transfer all existing entries of *D. tophaceus* to this subspecies. The new distribution is **1-72, (73), 74-85, (86), 87-91, 93-98, (99), 100-106, (107), 108-112, H1-12, (14), 15, 16, 18-25, (26), 27-31, 33-40, C.**
- 72.12. *Didymodon australasiae*.** **4:** crevice in wall of lighthouse, Lundy, SS132443, 2006, P. Martin; **32:** on soil under low post-and-rail fence by a small car park, public open space, 90 m alt., Foxfields, Grange Park, SP7681054770, R.H. Carter; **57:** on shaded, friable soil on bank by path at edge of housing estate, Hillstown, Bolsover, SK4769, 2019, T.L. Blockeel 48/011.
- 72.15. *Didymodon acutus*.** **44:** east end of C9 Range, Pendine, SN2840807168, M.D. Sutton; **45:** edge of limestone track, Trevallen trackside, SR9711493098, M.D. Sutton.
- 72.16. *Didymodon icmadophilus*.** **65:** on calcareous soil by stream, High Ellington gravel pits, SE21768247, S.V. O'Leary & S.L. Pilkington.
- 72.18. *Didymodon tomaculosus*.** **44:** recently exposed/rutted wet clay, east of Capel Dewi, SN4960219939, M.D. Sutton.
- 76.3. *Aloina aloides*.** **72:** on crushed concrete, The Cottage, Crichton Estate, NX987741, C. Miles (E).
- 77.13. *Tortula atrovirens*.** **111:** Great Head, South Ronaldsay, Orkney, earth bank by shore, ND465861, J. Crossley, conf. N.G. Hodgetts.
- 77.18. *Tortula caucasica*.** **14:** steep earth bank on ditch running parallel to river, River Cuckmere, below High and Over, TQ51350120, S. Rubinstein.
- 77.18A. *Tortula pallida*.** **5:** edge of saltmarsh, 5 m alt., Wall Common, Steart Peninsula, Bridgwater, ST2545, 2017, A.J.P. Branson; **34:** low soil ledge at edge of saltmarsh, Cowhill Pill, ST59709237, D.A. Callaghan.
- 77.21.b. *Tortula acaulon* var. *pilifera*.** **57:** on light, dry soil on anthill by limestone boulder, Tideswell Dale, SK15407352, T.L. Blockeel 50/066.
- 77.21.c. *Tortula acaulon* var. *papillosa*.** **34:** arable field, Rodmarton, ST9487697437, P. Martin; **45:** bare patch in short turf on limestone slope, Castlemartin Range East (Trevallen Down), SR9748793169, M.D. Sutton.
- 78.1. *Microbryum starckeanum*.** **15:** on steep scrubby chalk downs, Boarley Warren, NW of Boxley, TQ76425997, S. Lemon.
- 78.2.b. *Microbryum davallianum* var. *conicum*.** **6:** corner of arable field, 10 m alt., Pibsbury, ST45002584, S.L. Pilkington 21123; **29:** newly sown (or re-sown) lawn between pavement and flats, 12 m alt., S side of King's Hedges Road, Cambridge, TL450616, 2002, C.D. Preston.
- 78.3. *Microbryum rectum*.** **H20:** on soil in garden, Oldcourt, Bray, O25821768, R.L. Hodd.
- 79.1. *Hennediella stanfordensis*.** **6:** on compacted, vertical soil overhang by the main footpath, Redcliff Bay, Portishead, ST44097604, D. Hawkins.
- 79.2. *Hennediella macrophylla*.** **9:** on clay bank by River Stour, Hammoon, Sturminster Newton, ST82071459, A.J.P. Branson; **12:** on trampled soil between tree roots, Water Lane, Winchester, SU48632943, J.D. Sleath.
- 79.3. *Hennediella heimii*.** **34:** upper saltmarsh, Northwick Warth, ST54828652, D.A. Callaghan.
- 82.4.a. *Syntrichia montana* var. *montana*.** **104:** outcrop of 'dirty' limestone on cliff, 110 m alt., Bealach Cumhang, NG50334457, N.G. Hodgetts 11122.
- 82.9. *Syntrichia latifolia*.** **95:** base of tree by river, 204 m alt., River Spey, Inverallen House, NJ0275426192, R.T. Whytock.
- 90.1. *Brachydontium trichodes*.** **73:** north-facing crags, 520 m alt., Lumps of Garryhorn, NX5191, R.T. Whytock, conf. S.L. Pilkington.
- 93.9. *Grimmia arenaria*.** Delete **46:** 2006.003.281; Delete **69:** C.2009.001.323, both redetermined as *G. donniana* by D.A. Callaghan supported by ITS1 sequencing.
- 93.10. *Grimmia elongata*.** **47:** tight cushions on shale rock, 395 m alt., Ceunant Clywedog, SN84299311, S.D.S. Bosanquet.
- 93.11. *Grimmia longirostris*.** **48:** on south-facing rock outcrop, 410 m alt., Upper Afon Mawddach above Cwm yr Allt-llwyd, SH804288, G.P. Rothero.
- 93.17. *Grimmia orbicularis*.** **11:** on concrete capping of wall, South side of Kingsgate Street, St Cross, Winchester, SU47662892, J.D. Sleath.
- 93.18. *Grimmia torquata*.** **65:** 450 m alt., White Force, Cronkley Fell, NY8517228007, 2015, J. O'Reilly.
- 94.1. *Racomitrium ellipticum*.** **111:** slabby sandstone

- rocks in coastal heath, 30 m alt., Papa Westray, North Hill, HY500545, N.G. Hodgetts 11123.
- 94.2. *Racomitrium aciculare*. 29†:** on boulders in large group imported for landscaping around SE side of pond, 10 m alt., Unit 330 (Biofidelity), Cambridge Science Park, TL46286170, C.D. Preston.
- 94.7. *Racomitrium affine*. 84:** exposed basalt crag, Binny Crag, NT044735, 2003, D.F. Chamberlain & E.M. Kungu C.2004.007.62, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008).
- 94.8*. *Racomitrium heterostichum* sensu Hill *et al.* (2008).** All entries redetermined by T.W. Ottley. Delete **2:** C.2003.014.2970, this is *R. obtusum*; delete **8:** C.2001.019.19023, this is *R. heterostichum* s. str.; delete **20:** C.2006.003.654, this is *R. obtusum*; delete **29:** C.2001.019.19029, this is *R. obtusum*; delete **44:** C.2002.019.269, this is *R. affine*; delete **46:** BC.2001.019.6368, this is *R. obtusum*; delete **48:** C.2001.019.6371, this is *R. obtusum*; delete **49:** C.97.2.57, this is *R. affine*; delete **49:** C.2001.019.6374, this is *R. obtusum*; delete **50:** C.2001.019.6376, this is *R. obtusum*; delete **59:** C.2003.006.26, this is *R. obtusum*; delete **64:** C.2010.030.3362, this is *R. fasciculare*; delete **68:** C.2003.014.2958, this is *R. heterostichum* s. str.; delete **70:** C.2002.023.655, this is *R. affine*; delete **71:** C.96.19.254, this is *R. sudeticum*; delete **84:** C.2004.007.62, this is *R. affine*; delete **87:** C.2009.001.131, this is *R. affine*; delete **88:** C.2002.023.658, this is *R. heterostichum* s. str.; delete **93:** C.2005.006.242, this is *R. obtusum*; delete **104:** C.97.2.59, this is *R. fasciculare*; delete **112:** C.2009.001.214, this is *R. heterostichum* s. str.; delete **H3:** C.2003.006.297, this is *R. obtusum*; delete **H13:** C.2008.002.347, this is *R. obtusum*; delete **H25:** C.2004.007.265, this is *R. obtusum*; delete **H38:** C.97.2.63, this is *R. obtusum*.
- 94.8. *Racomitrium obtusum*. 2:** quarry, De Lank Quarry, SX1075, 1998, R.J. Murphy C.2003.014.2970, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **3:** granite tor, 305 m alt., Bench Tor, SX69157163, S.L. Pilkington 21042, conf. T.W. Ottley, muticous form, growing with awned fruiting plants; **20:** on roof tiles, with *Campylopus introflexus*, 95 m alt., Piggotts End, Hemel Hempstead, TL053088, 2005, C.T.W. Tipper 2006.003.654, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **24:** on roof tiles on south wall, Turville Church, SU767912, 2013, S.V. O'Leary, conf. T.W. Ottley; **29** new in (): on damp clinker at side of sewage bed, Madingley Park, Cambridge, TL3960, 1961, S.J.P. Waters C.2001.019.19029, det. T.W. Ottley, previously accepted as *R. heterostichum* s. lat; **34:** boulder top, Buckstone Wood, SO5416612269, P. Martin & C. Halpin; **40:** Titterstone Clee Hill, SO5905877889, 2013, P. Martin; **42:** disused quarry, Fan Bwlch Chwyth, Heol Senni, SN91422220, C. Halpin, conf. T.W. Ottley; **47:** rock on riverbank, 145 m alt., Dolanog: River Vyrnwy, SJ07251304, S.L. Pilkington 21081; **48:** rocks, by Bird's Rock, SH642070, 1994, S.V. O'Leary & J.W. Bates, conf. T.W. Ottley; **50:** on rocks in and by stream, Pistyll Rhaedr, SJ075298, 1984, N.G. Hodgetts C.2001.019.6376, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **58:** on gritstone block by long-derelict wall on moorland slope, 265 m alt., near Crowden, Longdendale, SK06719958, T.L. Blockeel 50/180; **59:** Higham, SD806372, 2002, J. Lowell C.2003.006.26, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **65:** on a tumbledown stone wall by a stream, 260 m alt., Masham Moor: Grimes Gill Wood, SE137784, S.L. Pilkington 21063, awned form; **69:** boulder in moorland, Helton Fell, NY4809120219, D.A. Callaghan; **70:** dry stone dyke, by Smither Gill, south of Salkeld Dykes, Great Salkeld, Penrith, NY551343, 2017, R.W.M. Corner; **85:** dry vertical rock face on low crag, 374 m alt., Craigen Gaw, Lomond Hills, NO20480714, 2016, T. ap Rheinallt 85/16/6; **93:** on stone beside track, Gight Woods SWT reserve, NJ819389, 2004, J.D. Sleath C.2005.006.242, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **105:** on boulder, Allt Mor, Applecross, NG7112244104, 2017, P. Martin; **110:** large rock outcrop on moor, 77 m alt., Beinn Ghrideag, nr Stornoway, NB36033305, 2020, T. ap Rheinallt 110/20/6; **112:** in rock crevice, Ness of Trebister, HU4551238677, 2018, S.V. O'Leary, conf. T.W. Ottley; **H1:** on boulder, Cummeenduff Glen, V8070582295, 2019, S.V. O'Leary, conf. T.L. Blockeel; **H3:** on large boulder, 530 m alt., Gougane Barra, Lough Fadda, W0764, 2002, T.L. Blockeel C.2003.006.297, det. T.W. Ottley, previously

accepted as *R. heterostichum* sensu Hill *et al.* (2008); **H13**: on granite boulder, Mount Leinster, NW side below the summit, S8252, 2007, T.L. Blockeel C.2008.002.347, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **H25**: boulder on Miner's Trail above holy well, 150 m alt., Arigna, Kilonan Mountain, G922130, 2002, N.G. Hodgetts C.2004.007.265, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill (2008); **H35**: rock, Glentorran Lough, Derryveagh Mountains, B808108, 2016, P. Martin.

94.9. *Racomitrium heterostichum* s. str. 29†: large isolated boulder by entrance to Unit 330, imported for landscaping, 10 m alt., Unit 330 (Biofidelity), Cambridge Science Park, TL46256172, C.D. Preston; **42**: stone wall along field margin south of the reservoir, Lower Neuadd, north of Merthyr Tydfil, SO03571726, C. Halpin; **48**: on top of dry-stone wall, Diffwys, SH66492322, T.W. Ottley 21091503; **68** new in (): boulders, Bizzle Burn, 1963, R.J. Murphy C.2003.014.2958, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **86**: on rocks at edge of field, 170 m alt., Corrie of Balglass, NS5950186946, 2011, E.M. Kungu C.2012.014.310, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008); **112**: on acid rocks in field, 15 m alt., Loch Asta, SW of, Mainland, HU410409, 2008, S.D.S. Bosanquet, C.2009.001.214, det. T.W. Ottley, previously accepted as *R. heterostichum* sensu Hill *et al.* (2008).

95.3. *Hedwigia stellata*. 29†: on boulder in large

group imported for landscaping around SE side of pond, 10 m alt., Unit 330 (Biofidelity), Cambridge Science Park, TL46286170, C.D. Preston.

- 100.1. *Splachnum sphaericum*. 111**: blanket bog, Withi Gill, Hoy, ND25479624, J. Crossley.
- 100.2. *Splachnum ampullaceum*. H18**: cutover raised bog, Sharavogue Bog, S05259837, 2017, G.F. Smith R00058517a07 (DBN).
- 106.3. *Bartramia ithyphylla*. 24**: in hedgebank by path, Great Cockshoots Wood, SU8133794515, S.V. O'Leary.
- 110.8. *Bryum gemmilucens*. 45**: clay on limestone chips in target gully, Flimston Down, Castlemartin Range West, SR9166695138, M.D. Sutton; **46**: sandy areas on forest track, Trychrug south, SN541598, T.W. Ottley 21110101.
- 110.11. *Bryum dyffrynense*. 45**: open wet sand area in coastal dune (old sandpit), Brownslade Burrows, SR8954798421, M.D. Sutton (Fig. 8).
- 110.12. *Bryum radiculosum*. H8**: limestone quarry, 20 m alt., Irish Cement Quarry, Castlemungret, R5253954932, J.L. Denyer & R.L. Hodd, conf. R.L. Hodd.
- 110.18. *Bryum riparium*. 5**: flushed shaley slope, 440 m alt., The Chains Valley, near Simonsbath, SS746418, A.J.P. Branson; **45**: edge of rocky moorland stream, Mynydd Preseli: Afon Wern, SN0994131888, M.D. Sutton.
- 110.24. *Bryum alpinum*. 8**: wet disturbed ground near mire/flush, 30 m alt., Plaitford Common, SU27671919, S.L. Pilkington 21071; **H21**: on flushed rocks in river valley, Cataract of the Rowan Tree, Glenasmole, O119192, R.L. Hodd.
- 110.36.a. *Bryum algovicum* var. *rutbeaenum*. H21**: in sand dunes, North Bull Island, O24683785, 2019, P. Perrin & J. Martin, conf. R.L. Hodd.
- 110.41. *Bryum donianum*. 24**: on muddy sides of sunken lane through wood, Chalkpit Wood, SU7935685832, S.V. O'Leary.
- 110.46. *Bryum creberrimum*. 24**: on anthill, Ivinghoe Hills SSSI, SP9647115987, S.V. O'Leary.
- 110.47. *Bryum pallescens*. 33**: extensive stand on concrete beneath wall of metal barn, Fiddington, SO9231230985, R.V. Lansdown; **34**: concrete beneath drips from metal roof of barn, Brookland, near Dymock, SO6749330472, R.V. Lansdown.
- 110.48.a. *Bryum pseudotriquetrum* var. *pseudotriquetrum*. 48**: moist ground at foot of rock outcrop, upper part of Cwm yr Allt-Lwyd,



△ Figure 8. Habitat of *Bryum dyffrynense*, Brownslade Burrows, vc 45. Matt Sutton

- SH80432884, T.L. Blockeel.
- 110.48.b. *Bryum pseudotriquetrum* var. *bimum*.** **57:** on exposed, sloping margin of excavated pond, Sharp's Bottom, near Smisby, SK33742028, T.L. Blockeel 50/056.
- 110.49. *Bryum caespitium*.** **33:** bare ground at the top of Cleeve Cloud, 283 m alt., Cleeve Common, SO9847525398, R.V. Lansdown; **H8:** quarry (limestone), 20 m alt., Irish Cement Quarry, Castlemungret, R5286554609, R.L. Hodd & J.L. Denyer, conf. R.L. Hodd.
- 110.50. *Bryum kunzei*.** **45:** thin turf around limestone rocks at top of slope, Trevalen Down, SR9747593178, M.D. Sutton.
- 110.51. *Bryum bornholmense*.** **46:** open ground/soil between burnt *Molinia* tussocks, Cefn y Cnw, SN77716002, M.D. Sutton.
- 111.1. *Rhodobryum roseum*.** **H18:** calcareous grassland bank on esker, 40 m alt., Lusmagh, Little Brosna Callovs, N00761034, H. Mulcahy, M. Long & N.G. Hodgetts 11205, conf. N.G. Hodgetts; **H25:** on/near outcropping calcareous rock, Milltown, M887434, M. Long, conf. S.L. Pilkington.
- 113.11. *Poblia annotina*.** **H21:** on crumbling soil bank by river, Cataract of the Rowan Tree, Glenasmole, O1202519094, R.L. Hodd.
- 118.1. *Plagiomnium cuspidatum*.** **H1:** on lakeside rocks, below Minister's Fall, Glenna, V9297787311, R.L. Hodd.
- 120.3. *Zygodon rupestris*.** **24:** on elder, Park Wood, Turville, SU7663991787, S.V. O'Leary.
- 122.3. *Orthotrichum pulchellum*.** **H14:** willow in lagg woodland, Abbeyleix Bog, S4383, G.F. Smith 2109069 (DBN).
- 122.4. *Orthotrichum columbicum*.** **64:** on willow growing on low river island, several tufts with well-grown capsules, 80 m alt., Grewelthorpe, River Ure, SE23617723, S.L. Pilkington 21061, conf. T.L. Blockeel; **65:** on lower branches of *Acer pseudoplatanus* by car park, very few small fruiting tufts, 90 m alt., Mar Field Nature Reserve, Masham, SE21658244, S.L. Pilkington & S.V. O'Leary.
- 122.10. *Orthotrichum pallens*.** **65:** numerous fruiting tufts on a number of sub-mature *Acer pseudoplatanus* and *Fraxinus excelsior* trees planted close to track, 90 m alt., Mar Field Nature Reserve, Masham, SE21728247, S.L. Pilkington & S.V. O'Leary 21062, conf. T.L. Blockeel.
- 122.13. *Orthotrichum tenellum*.** **94:** on elm tree branch, 305 m alt., Poll na Feola, NJ1519, R.T. Whytock.
- 124.1. *Plenogemma phyllantha*.** **H14:** willow in lagg woodland, Abbeyleix Bog, S4383, G.F. Smith 2109066 (DBN).
- 126.3. *Ulota drummondii*.** **45:** on *Ulex europaeus* branch by moorland stream, Mynydd Preseli, SN1107431371, M.D. Sutton; **H21:** on *Sorbus aucuparia* in ravine, Cataract of the Rowan Tree, Glenasmole, O1205418997, R.L. Hodd.
- 126.5. *Ulota crispula*.** **62:** on *Salix* on wooded stream bank, Helwath Beck, Jugger Howe, SE94769836, T.L. Blockeel 50/160; **64:** on oak in moist woodland, 12 m alt., Askham Bog, near York, SK56864788, T.L. Blockeel & S.J. Heathcote 50/093; **65:** on sycamore, Ellington Firth, SE1933984057, S.V. O'Leary & C. Halpin.
- 126.6. *Ulota intermedia*.** **50:** on oak in landscaped garden, Bodnant Garden, SH797720, T.L. Blockeel 50/135; **94:** on juniper, 330 m alt., Delnabo, Tomintoul, NJ1617, R.T. Whytock; **104:** epiphytic on elder in car park, 40 m alt., Portree, Aros Centre, NG476422, N.G. Hodgetts 11209; **H1:** on branch of ancient holly, Gortadirra, Tomies, V9106787551, R.L. Hodd.
- 126.7. *Ulota crispa* s. str. 3:** on hazel near river, Bovey Valley, SX78097989, S.L. Pilkington; **23:** on mature *Sambucus nigra*, Watlington Old Road, SU70129398, T. Harrison, conf. S.V. O'Leary; **40:** on dead standing hazel trunk, River Worfe Valley, Beckbury (near), SJ758009, Peter Thompson; **H21:** on *Salix* in woodland, Rathcoole, O025264, R.L. Hodd.
- 129.1. *Leptotheca gaudichaudii*.** **10†:** on *Dicksonia antarctica* stems, Ventnor Botanic Gardens, SZ548769, G.R.L. Greiff & C.R. Pope. Only a single fern colonised; moss in relatively poor condition with much chlorosis.
- 134.1. *Daltonia splachnoides*.** **47:** *Salix* by stream in conifer plantation, 160 m alt., south side of Afon Caws, SH81861036, S.D.S. Bosanquet.
- 140.2. *Orthotrichum intricatum*.** **58:** on slightly base-rich sandstone, 330 m alt., Black Crag, Crowden, Longdendale, SK06469991, T.L. Blockeel 50/190.
- 142.2. *Isopterygiopsis pulchella*.** **H30:** In humid crevice on north-facing slope, Tents Mountain, H008322, R.L. Hodd & E. Mc Dhuill.

- 145.1. *Pterigynandrum filiforme*. 24:** horizontal trunk of fallen ash, Horton Wood, SU8688490240, S.V. O'Leary.
- 148.1. *Myrinia pulvinata*. 34:** on *Salix cinerea* trunk, Ashleworth Meadows, SO8268925913, R.V. Lansdown.
- 152.3. *Campylium protensum*. H18:** peaty ground by ditch in calcareous flood meadow, 30 m alt., Lusmagh, Little Brosna Callows, N00281039, N.G. Hodgetts 11207; **H21:** dune slack, North Bull Island, O222357, M. Lyons & D. Doogue, conf. T.L. Blockeel.
- 154.2. *Hygroamblystegium tenax*. 56:** flush in cliff interspersed with gypsum, 35 m alt., Clifton Wood LWS, Clifton Village, SK53923486, M. Crittenden.
- 154.4. *Hygroamblystegium humile*. 34:** soil in field, Tetbury, ST8798193334, 2020, P. Martin, conf. T.L. Blockeel.
- 156.1. *Conardia compacta*. 72:** base of dry rock face, Maidenbower Craigs, NX9874, C. Miles (E).
- 157.3. *Drepanocladus sendtneri*. H18:** calcareous flood meadow, 30 m alt., Lusmagh, Little Brosna Callows, N00281039, N.G. Hodgetts 11206.
- 160.3. *Platyhypnum duriusculum*. 98:** wooded ravine, on boulder in torrent, 280 m alt., lower part of Coire Gabhail, Glencoe, NN16995584, D.G. Long & D. Bell 47183.
- 161.1. *Serpolekea confervoides*. 45:** old lime-mortared wall by culvert over woodland stream, Knapps Farm, Martletwy, SN05491004, M.D. Sutton.
- 167.1. *Sarmentypnum exannulatum*. H21:** in flush on valley side, Upper Glenasmole, O11751947, R.L. Hodd.
- 168.1. *Straminergon stramineum*. H21:** in flush on valley side, Upper Glenasmole, O11751947, R.L. Hodd.
- 169.2. *Calliergon giganteum*. 56:** calcareous fen with associates *Drepanocladus aduncus*, *Eleocharis palustris*, *Glyceria notata*, *Juncus acutiflorus*, 140 m alt., Friezeland SSSI, Underwood, SK47565060, M. Crittenden.
- 172.1. *Hamatocaulis vernicosus*. 5:** in small upwelling flush on bank of river, 395 m alt., Long Chains Combe, SS74734219, S.L. Pilkington.
- 173.1. *Scorpidium revolvens*. 95:** in flush in heathland, 276 m alt., Muckrach Estate, NH9728, R.T. Whytock.
- 174.1. *Leskea polycarpa*. 49:** on trunk of *Salix* by river, Caernarvonshire bank of the Afon Conwy, near Trefriw, SH788632, T.L. Blockeel 50/133; **H8:** silty tree by River Shannon, 0 m alt., Irish Cement Quarry, Castlemungret, R5346755803, R.L. Hodd & J. Denyer.
- 178.3. *Thuidium assimile*. H8:** limestone quarry on soil/gravel, 13 m alt., Irish Cement Quarry, Castlemungret, R5304054588, R.L. Hodd & J.L. Denyer, conf. R.L. Hodd.
- 181.1. *Scorpiurium circinatum*. H31:** on rock outcrop close to edge of woodland, 100 m alt., Prieststown, Tinure, O0533383557, M. Eakin.
- 184.5. *Rhynchostegium megapolitanum*. 34:** sandy soil on steep roadbank, north of Newent, SO7224526636, R.V. Lansdown.
- 185.3. *Rhynchostegiella curviseta*. 56:** boulder at edge of stream in Magnesian Limestone, tributary of River Meden, Pleasley Vale, Northfield Plantation, SK52946520, M. Crittenden, conf. S.L. Pilkington; **57:** on face of shaded limestone cutting in old quarry, Ticknall Limeyards, SK3524, 2016, T.L. Blockeel 45/715.
- 188.3. *Oxyrrhynchium speciosum*. 65:** on rocks in shaded pool, Ellington Firth, SE181842, S.V. O'Leary & C. Halpin.
- 199.1. *Stereodon callichrous*. 78:** east facing rocky gully, on mossy bank by waterfall, 425 m alt., Witch Linn ravine, Talla Linfoot, NT13072019, D.G. Long & D. Bell 47027.
- 200.2. *Pseudohygrohypnum subeugyrium*. 72:** Rocky mountain stream, on damp rocks by stream, 500 m alt., Tail Burn just below Loch Skene, Moffatdale, NT17551573, D.G. Long 47202, conf. T.L. Blockeel (E).
- 208.2. *Sematophyllum substrumulosum*. 27:** on rotten conifer log in SE corner of mature conifer plantation, East of Granny Bard's Lane, Horstead, TG269168, L. Parkerson; **48:** on partially decorticated log of fallen tree (possibly alder), one small patch with a couple of capsules, 45 m alt., Foel Tyr Gawen, SH63040740, M.J. Stribley 630; **57:** on the trunk of a small birch tree in oak-birch woodland, 135 m alt., Shining Cliff Wood, near Ambergate, SK333529, A.J. Hodgson & T.L. Blockeel 50/098.
- 209.1. *Pleurozium schreberi*. H14:** cutover bog, Abbeyleix Bog, S4383, G.F. Smith 2109064 (DBN).

- 213.2. *Hylocomiastrum umbratum*. 78:** east-facing rocky gully, on steep rocky bank with *Thuidium* and ferns, 390 m alt., Witch Linn ravine, Talla Linfoots, NT13142021, D.G. Long & D. Bell 47024.
- 221.1. *Leucodon sciurioides*. 75:** on large diameter tree by roadside, Sorn, NS5599226424, R.T. Whytock.
- 222.1. *Antitrichia curtipendula*. 12:** on horizontal birch log at edge of woodland, Chawton Park Wood, SU672361, J.D. Sleath.
- 223.2. *Neckera pumila*. 11:** on vertical bark of young ash tree, Bunstead Lane Quarry, Hursley, SU43602548, J.D. Sleath; **H14:** willow in lagg woodland, Abbeyleix Bog, S4383, G.F. Smith 2109039 (DBN).
- 223.3. *Neckera crispa*. 58:** on slightly base-rich sandstone, 330 m alt., Black Crag, Crowden, Longdendale, SK06469991, T.L. Blockeel 50/189, originally found by Christian Heintzen.
- 224.1. *Homalia trichomanoides*. 95:** base of tree by river, 285 m alt., Urlarmore, NJ1420, R.T. Whytock.
- 225.2. *Thamnobryum maderense*. 45:** edge of damp rock face at top of old shale quarry, Craig y cwm, SN0961531197, M.D. Sutton.
- 228.3. *Heterocladium wulfsbergii*. 45:** rocky bank above waterfall, Ffynone, SN23733814, M.D. Sutton.
- 229.4. *Isothecium boltii*. 78:** moorland valley, on rock slab by stream, 483 m alt., Gameshope Valley just above Donald's Cleuch, NT13931750, D.G. Long, D. Bell & E.M. Kungu 47117; **H21:** on rocks in river, Cataract of the Rowan Tree, Glenasmole, O11721947, R.L. Hodd.

Collectors/contributors of records

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Sharon Pilkington

66 Newtown, Westbury, Wiltshire BA13 3EF

e sharon.pilkington1@btinternet.com