

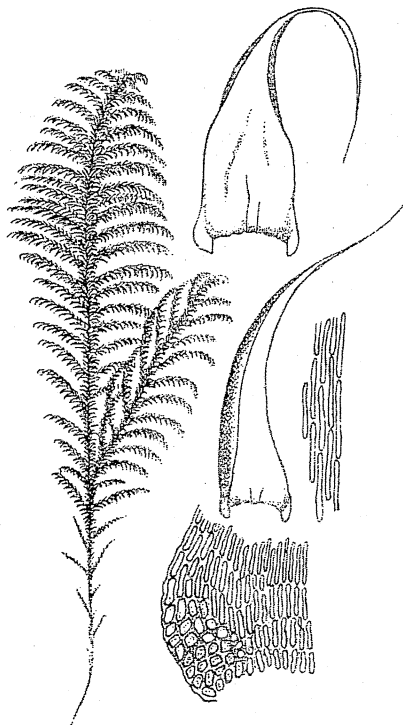


BULLETIN OF THE BRITISH BRYOLOGICAL SOCIETY

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BRITISH BRYOLOGICAL SOCIETY

The British Bryological Society exists to promote the study of mosses and liverworts. The Society was constituted in its present form in 1923, replacing the Moss Exchange Club founded in 1896.

Two field meetings, each usually of a week's duration, are held every year in districts of bryological interest. In addition, two weekend meetings are held in the autumn, one for the Annual General Meeting, the presentation of papers and fieldwork, and the other for practical instruction in the examination and identification of bryophytes.

Members of the Society are entitled to receive the Society's *Journal* and its *Bulletin* free of charge; to borrow books, periodicals and reprints from the Society's library; to consult or borrow specimens from the Society's herbarium; and to consult the Society's panel of referees for assistance in the identification of specimens.

The subscription, due in advance on 1 January each year, is £20.00 for Ordinary members; £10.00 for Senior members, Junior members and Student members; and £1.00 for Family members (who do not receive the *Journal*).

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The cover illustration is of *Pseudostereodon procerrimum*
(Mol.) Flschr. (= *Ctenidium procerrimum*) from W.
Mönkemeyer's *Die Laubmoose Europas*, 1927.



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ARTICLES FOR *BULLETIN* 81

Items for inclusion in the summer 2003 issue of the *Bulletin* should be sent to me at the address below by **30 May 2003**. Wherever possible, material should be provided as word-processing files, either on disk or by e-mail.

Marcus Yeo, Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough, PE1 1JY; e-mail: marcus.yeo@jncc.gov.uk.

SUBSCRIPTIONS FOR 2003

Subscriptions were due on 1 January 2003 and confirm entitlement to the *Journal of Bryology* and the *Bulletin* for the current year, as well as for the other services provided by the Society. If you have not already paid your subscription then an early remittance to the Membership Secretary (address below) will help to minimise postage costs.

I would like to thank all of those members who paid promptly last year. However, it was necessary to send a large number of reminders. Members will realise that this results in significant expense to the Society, and are asked to pay promptly to minimise such avoidable costs.

Current rates are as follows:

Ordinary members:	£20.00
Family members:	£1.00
Concessionary subscription:	£10.00

There are three categories of members who may opt to pay the concessionary subscription:

Senior members:	Ordinary members who have been members of the Society for 40 or more years.
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Payment may be made:

1. By £ Sterling cheque payable on a London bank.
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3. By credit card mandate (ONLY Barclaycard, Visa, Access, Mastercard, Eurocard accepted). **The cost to the Society of this method is 5% of the subscription; this must be included in the mandate, making a total of £21.00 for ordinary members (£10.50 for concessionary subscriptions).**

An alternative method of payment is available for North American members. For details of this, and for standing order mandate forms, please contact me at the address below.

Please note that both the collection and conversion of payments involves a cost to the Society and to the member, and this cost should be minimised as far as possible by prompt payment and choice of the most cost-effective system of payment available.

Cash is sent at sender's risk.

Mark Pool, 91 Warbro Road, Babbacombe, Torquay, Devon, TQ1 3PS, UK; e-mail: Mark.Pool@care4free.net.

PROCEEDINGS OF THE BRITISH BRYOLOGICAL SOCIETY

Throughout the following accounts of BBS meetings, new vice-county records are indicated by an asterisk (*). Nomenclature follows Blockeel & Long (1998), *A Check-list and Census Catalogue of British and Irish Bryophytes*.

SPRING FIELD MEETING 2002, ISLE OF WIGHT

The headquarters for this meeting was the Channel View Hotel at Shanklin. Mrs Lorna Snow, BBS recorder for VC 10 and local secretary for the meeting, was unable to join us for the excursions as she was caring for her sick husband but called in at the hotel on two or three occasions to check on progress. She said the meeting would be particularly useful because a new Flora of the Isle of Wight was being prepared for publication later in the year.

On the evening of Wednesday 13 March, Dr Colin Pope, the Isle of Wight County Council's ecologist, gave an introduction to the ecology of the island. He also provided maps of all the locations to be visited and reported that where necessary he had obtained permissions from the landowners concerned.

THURSDAY 14 MARCH

Briddlesford Copse

This mixed broadleaved ancient woodland on Hamstead Clay belongs to the People's Trust for Endangered Species. The BBS Southern Group had surveyed the eastern end in 1992, so we examined the western end, in steady rain. The more interesting species seen included *Ctenidium molluscum* (the 'woodland taxon'), *Hookeria lucens*, *Orthotrichum striatum*, *Plagiothecium latebricola* and *Lejeunea lamacerina*. The Isle of Wight Steam Railway runs through the wood and was separately recorded. *Seligeria calycina* and *Rhynchostegiella curviseta* were found there, and members were able to admire a fine show of flowering Narrow-leaved Lungwort (*Pulmonaria longifolia*) which has its British headquarters in the Isle of Wight. The access to this site passed a cottage near Woodhouse Farm, where Jonathan Sleath found *Grimmia ovalis** growing on a clay tiled roof.

Woods by Palmers Brook

These woods are also on the Hamstead Clay. The water level in Palmers Brook was very high after the heavy rain, so no recording was possible along the banks. *Leskea polycarpa* (which

is rare in VC 10) was seen on trees by the river in both woods. *Orthotrichum stramineum* and *O. striatum* were found in Brocks Copse, and *O. pulchellum* in Woodhouse Copse.

Arable fields

An 'arable fields' group looked at a field near Newbridge, where *Tortella inflexa* was found on a chalk stone. They also looked at another field at Wellow where *Bryum violaceum** was recorded by Mark Hill and Chris Preston (it was also seen in the other field).

FRIDAY 15 MARCH

Bohemia Bog

This is a very small area and almost the only existing bog on the island. In spite of heavy rain, members were able to observe the remarkable bryological richness of the site. This includes seven species of *Sphagnum*, *Aulacomnium palustre*, *Philonotis fontana** (first post-1950 record), *Aneura pinguis*, *Riccardia latifrons*, *Kurzia pauciflora* and *Cephalozia macrostachya* var. *macrostachya* (the last collected and determined by Jean Paton).

Arable fields

Chenia leptophylla was found in an arable field at Brook during the 1964 BBS meeting and described as *Tortula vectensis*, new to science. The only member present who had been to that meeting was Jean Paton, but Rod Stern had seen the plant at various times in more recent years. When we arrived at the site, we were dismayed to see that it had just been ploughed, but fortunately a very narrow strip adjoining the roadside fence had been left, and we were able to find some *Chenia* plants in a few patches of bare soil.

A field at Apse Heath was surveyed by an 'arable fields' group, and in spite of very bad weather they found twelve species, including *Riccia sorocarpa*.

Other localities

Two chalk pits were visited. Strawberry Lane chalk pit is mainly south-facing chalk grassland with some scrub. The most interesting finds among a rich assemblage of calcicoles included *Pleurochaete squarrosa*, *Tortula lanceola*, *Microbryum starckeanum*, *M. rectum* and *Scorpiurium circinatum*. A splinter group looked at Lynch Lane chalk pit, which is near the previous one. As well as *Pleurochaete*, they recorded *Didymodon acutus**, *Brachythecium mildeanum* and *Pottiopsis caespitosa** c.fr., these being determined by Mark Hill.

An alder carr was inspected at Buddle Brook, Brighstone. *Hookeria lucens* was found to be locally abundant and *Orthotrichum pulchellum* was also seen.

SATURDAY 16 MARCH

Shanklin Chine

The visit here was very brief, and mainly to check on the status of *Philonotis marchica*. It was found on a damp rock face but in very small quantity and much reduced compared with some

years ago. Also found were *Epipterygium tozeri*, *Anthoceros punctatus*, *Phaeoceros laevis* and a very small amount of *Blasia pusilla*.

Luccombe Chine

Some of the most active members went down the steep sheltered valley comprising some landslip and mature woodland. David Holyoak found *Bryum donianum** (first post-1950 record) on soil on a path, and some other species seen were *B. gemmiferum*, *Eucladium verticillatum* and *Hookeria lucens*.

Bonchurch Landslip

Bonchurch Landslip is near the previous site and consists of wooded slopes and Upper Greensand rock faces and boulders, some of them large. Some of the site is inaccessible. *Scorpiurium circinatum* was abundant on rocks and stone walls. Other species included *Cololejeunea rossettiana* and *Mnium stellatum* found by David Long (both known from here for many years), as well as *Phaeoceros laevis*, *Leptobarbula berica* with immature capsules, and *Rhynchostegiella curviseta*.

Other localities

Needles Old Battery and Scratchell's Bay were inspected by a splinter group. They found a good selection of calcicoles and some less common pottiaceous species, such as *Tortula protobryoides*, *T. lanceola* and *Microbryum starckeanum*, as well as the seaside mosses *Hennediella heimii* and *Tortella flavovirens*.

At the end of the afternoon, in heavy rain, several members visited Shanklin Cliffs which are much altered through recent landslips. There are now few bryophytes to be seen but *Bryum gemmiferum* and *Anthoceros punctatus** were collected.

SUNDAY 17 MARCH

The Wilderness

A small group visited this site, which was described at the 1964 BBS meeting as 'alder fen carr', but which is now much drier and lacking a number of species seen previously. Only *Sphagnum fimbriatum* was found out of the six *Sphagnum* species seen in 1964. However, some less common mosses were recorded, including *Epipterygium tozeri*, *Plagiothecium latebricola* and *Platygyrium repens** (which was on trunks of several *Salix* trees).

Rocken End and St Catherine's Point

This area (except for the part affected by recent landslips and which was inaccessible) was seen by all those attending at one time or another on this day. One of the special plants of this site is *Acaulon triquetrum* which was seen by most if not all those present. Other plants of interest included *Tortula acaulon* var. *pilifera*, *T. viridifolia*, *Pterygoneurum ovatum*, *Bryum torquescens* and *Rhynchostegium megapolitanum*. The weather was sunny and warm for a change.

Tolt Rocks

Later in the afternoon we visited Tolt Rocks in most unpleasant wind and rain. These are a broken line of Upper Greensand rocks exposed to the west and the sea. We found plenty of *Porella platyphylla* but no one reported finding *P. obtusata* for which there had been a fairly recent record. As at the previous site, *Scleropodium tourettii* was frequent.

MONDAY 18 MARCH

Shide Chalk Pit

This is a Site of Special Scientific Interest near Newport, consisting of a disused chalk pit with scrub and a small stream. Fruiting *Leiocolea turbinata* was abundant. Mosses seen included *Campylium stellatum* var. *stellatum*, *Campyliadelphus chrysophyllus*, *Ditrichum gracile*, *Encalypta streptocarpa*, *Eucladium verticillatum*, *Seligeria calycina*, *S. calcarea* and *Gymnostomum viridulum**.

Fattingpark Copse

Fattingpark Copse is an oak woodland on the Hamstead Clay. Although no uncommon bryophytes were found, the wood is bryologically rich with 95 species recorded. Among the more interesting mosses were *Ctenidium molluscum* (the 'woodland taxon'), *Dichodontium pellucidum* and *Entosthodon fascicularis*. *Didymodon nicholsonii** was found on tarmac by the road access to the wood.

TUESDAY 19 MARCH

Afton Down

This is an extensive area of chalk grassland above the cliffs near Freshwater. The bryoflora was somewhat limited but included *Neckera crispa*, *Microbryum curvicolle*, *Pleurochaete squarrosa*, *Rhynchostegium megapolitanum*, *Scorpiurium circinatum* and *Weissia sterilis** (first post-1950 record).

Headon Warren

Belonging to the National Trust, this is an area of heathland with scrubby patches and some landslips, at the western end of the island. *Lophocolea semiteres** was found by David Long and Gordon Rothero on peaty slopes under *Calluna* in the south-west part where they also saw *Polytrichum piliferum* which is uncommon in VC 10. In the eastern part, other members saw some epiphytes on scrub, including five species of *Orthotrichum* and *Leptodon smithii* (the only record for this moss in the whole week).

St Helens Duver

David Holyoak and Jean Paton looked at this area of sand dunes and scrub on their way home, and found *Drepanocladus aduncus* s.str., *Bryum dunense* and *Cephaloziella hampeana*.

The meeting was considered to be a success in spite of generally poor weather. Lorna Snow and Colin Pope were thanked for efficient organisation of an interesting and varied programme. Jonathan Sleath has prepared an illustrated presentation of the meeting which can be viewed on the BBS website.

ROD STERN

SUMMER FIELD MEETING 2002, CARMARTHENSHIRE

Our base for the meeting was Glynhir near Llandybie, an 18th century mansion house with stone-built out-buildings converted into cottages and flats, and set in 200 acres of pasture and woodland. Sam Bosanquet, Lorna Fraser, Jonathan Graham (Saturday-Wednesday), Mark Lawley, Graham Motley (local secretary), Jean Paton, Mark Pool, and David and Marjorie Rycroft stayed at Glynhir, with Richard Fisk, Roy Perry (Saturday-Monday) and Phil Stanley (Saturday-Monday) staying in other nearby accommodation. Some local naturalists joined up with us on one or more days. A BSBI group, led by Richard Pryce and Arthur Chater, was also at Glynhir for the first part of the week.

One of the main purposes of the meeting was to aid recording for a bryophyte flora of Carmarthenshire (VC 44). Many of the localities visited during the week were bryologically unexplored or under-recorded, and most sites had not been visited by Jonathan, Graham or Sam, who between them have been recording in the county on-and-off over the past ten years. Apart from what was quite literally a five-minute visit to Breconshire (VC 42) on one of the days, all localities were in VC 44.

SATURDAY 29 JUNE

Mynydd Du (SN71)

On his way to Glynhir, Sam visited three under-recorded tetrads on moorland north of Brynaman. The degraded bogs and exposed Millstone Grit block screes in the Bwlchau Rhos-fain area proved unproductive, and *Nardia compressa* in the Aman Fawr was the only notable species found. A disused Carboniferous Limestone quarry high on Cefn Carn Fadog (at 512 m altitude) was more interesting. *Scapania cuspiduligera* was locally frequent on the quarry floor and on spoil heaps, *Blepharostoma trichophyllum* was found on limestone spoil, and *Leiocolea badensis* was collected from flushed turf.

Glynhir (SN6315)

As members arrived at Glynhir mid-afternoon, most were greeted by a displaying male peacock. The noisy behaviour of this and the other peacocks/hens meant that they would be a major talking point during the week. Before dinner, Graham, Jonathan, Sam, Mark Pool and Jean set off to explore the wooded gorge in the Glynhir grounds and bumped into Mark Lawley and Lorna who were just returning from the waterfall. Mark had found *Jubula hutchinsiae*, a new 10-km record for the species and an excellent start to the meeting. The main group pushed on into the woodland, which proved to be rather acidic, often with a dense understorey of rhododendron and laurel. We worked our way down into the gorge, which is

located on the Lower Coal Measures, and were rewarded with a fine sheet of Tunbridge Filmy-fern (*Hymenophyllum tunbrigense*) on the opposite bank. The gorge was very steep-sided and difficult to work. *Thamnobryum alopecurum* was the dominant bryophyte. Other species recorded included *Hookeria lucens*, *Jungermannia atrovirens*, *Plagiomnium rostratum*, *Lejeunea lamacerina* and *Hyocomium armoricum*, with *Saccogyna viticulosa*, *Amphidium mougeotii* and *Diphyscium foliosum* on an outcrop near the waterfall. As we clambered back up the slope Mark Pool spotted *Lophocolea fragrans* on a small rock outcrop and seconds later he found *Fissidens celticus* in typical habitat on a sparsely vegetated bank.

SUNDAY 30 JUNE

Laugharne-Pendine Burrows (SN2508 - SN3207)

Most of us were awoken at around 6.00 a.m. by the peacocks, whose calls easily masked those of the cockerel! Richard Pryce had arranged for the BSBI and BBS groups to visit the extensive dune system at Pendine, an MOD site. Local Countryside Council for Wales conservation officers Nigel Stringer, Sarah Andrews and George Johnson joined us for the day. After much form filling we were eventually let loose on the dunes. First stop was a rather dry area where bryophyte interest was limited, but Mark Pool found *Didymodon luridus* and there was a fine show of Common Twayblade (*Listera ovata*), Pyramidal Orchid (*Anacamptis pyramidalis*), Early Marsh-orchid (*Dactylorhiza incarnata*) and Southern Marsh-orchid (*D. praetermissa*). Roy Perry and Phil Stanley, who had been delayed due to traffic congestion, arrived in style, escorted to our group by a police vehicle. For obvious reasons, the Ordnance Survey maps of the area show very little detail and it was often difficult to get our bearings. Luckily, David was in possession of a hand-held Global Positioning System (GPS) and regularly called out the grid references, although on several occasions the GPS went haywire, which resulted in some speculation as to the reasons why.

We quickly moved a short distance to our next stop. By the track there was a promising-looking damp area with frequent Variegated Horsetail (*Equisetum variegatum*), but apart from *Aneura pinguis* it yielded little else. Over a dune ridge, another damp area was covered in Marsh Pennywort (*Hydrocotyle vulgaris*) and *Calliergonella cuspidata*, with a little *Drepanocladus polygamus* and *D. aduncus*. Despite the rather limited bryoflora our interest was sustained by vascular plants such as Sharp Rush (*Juncus acutus*) and Adder's-tongue (*Ophioglossum vulgatum*).

Further along the track, some willow scrub attracted our attention and was found to support a variety of epiphytes including *Ulota phyllantha*, *Orthotrichum tenellum* and *Cololejeunea minutissima*. Vascular plants in damp grassland and fen included Moonwort (*Botrychium lunaria*), Cyperus Sedge (*Carex pseudocyperus*) and Greater Bladderwort (*Utricularia vulgaris*). Drier dunes yielded *Tortella tortuosa* and *Syntrichia ruraliformis*. Arthur Chater demonstrated Sticky Stork's-bill (*Erodium lebelii*) to some of us. As cars moved off to the next site, Graham and Richard were a bit slow off the mark, and it was only by sheer luck that they refound the main group amidst the maze of tracks.

At this point we separated from the BSBI group and continued to the far eastern end of the dunes to some slacks where *Petalophyllum ralfsii* had previously been reported. *Tortella flavovirens* var. *flavovirens*, *Trichostomum brachydontium* and *T. crispulum* were quickly located. Nearby, a relatively fresh blow-out had only a few bryophytes (mainly *Bryum*

bicolor) but on a more muddy substrate David found *Riccia cavernosa* at only its second site in the vice-county. Some more mature slacks yielded *Campylium stellatum*, *Drepanocladus polygamus* and *Bryum algovicum* var. *rutheanum*, but the uncommon *Drepanocladus* species we were hoping for were absent.

We rejoined the BSBI group at a slack known to support Fen Orchid (*Liparis loeselii*). Several specimens of the orchid, some in flower, were quickly located and admired by all. *Calliergonella cuspidata* was again the dominant bryophyte in this area, with some more *Campylium stellatum*. *Drepanocladus aduncus* was found in a ditch. The willows had a similar epiphytic flora to that seen earlier, but with some additional species including *Orthotrichum lyellii*, *Cryphaea heteromalla* and *Microlejeunea ulicina*. The tarmac road leading off the dunes provided several new species for the day, including, rather unusually, *Cinclidotus fontinaloides*.

The bryophyte flora of the dunes was rather disappointing, although we only examined a small fraction of them and at an unfavourable time of year. It appears that the dunes have suffered in recent years due to a lack of grazing and probably a lack of disturbance by the military. However, most people were of the opinion that the quality of the vascular plants more than made up for the lack of bryophytes.

Llangynog (SN3316)

Returning to Glynhir, a few of us were keen to visit a disused dolerite quarry on the Llansteffan peninsula near Llangynog where, among other uncommon species, Sam had found *Grimmia laevigata* earlier in the year. By now the weather had taken a turn for the worse which tested the enthusiasm of the group. Sam was unable to relocate the original spot for *G. laevigata*, but did find a different tuft, thereby instantly doubling the known Carmarthenshire population of the species. He also found a tuft of a rather spiky-looking *Grimmia* nearby, which turned out to be *G. lisae**. Rocks on the quarry floor supported *Racomitrium lanuginosum*, *Ptychomitrium polyphyllum* and *Hedwigia stellata*, all many kilometres from their nearest known sites. *Diplophyllum obtusifolium* was spotted on a friable bank and *Lophozia excisa* was collected from a damp part of the quarry floor. Just along the road from the quarry we stopped briefly at a roadside bank known to support a population of *Rhodobryum roseum*, but only a single stem could be located in the gloom.

After dinner, Richard Fisk treated us to a display of some of the digital images he had taken during the day, including some lovely shots of *Riccia cavernosa* and *Liparis*. He also demonstrated the distribution of some arable *Bryum* species in relation to soils in his home county of Suffolk.

MONDAY 1 JULY

Allt yr Hebog (SN6844)

Our first stop of the day was an oak-dominated woodland, Allt yr Hebog, situated on Silurian shales on the north-eastern side of a hill rising above the village of Cwrt y Cadno. We met up with Nigel Stringer and Chris Forster-Brown in the village, and then worked our way to the woodland via a stream valley where *Diplophyllum obtusifolium*, *Jungermannia gracillima*, *Nardia scalaris*, *Dicranella rufescens* and *Fissidens celticus* were located in typical habitats.

The woodland was dominated by rather even-aged and relatively young trees, with a ground flora dominated by Bilberry (*Vaccinium myrtillus*) and *Rhytidiadelphus loreus*, and with occasional patches of *Sphagnum quinquefarium*. *Bazzania trilobata* was located by the track and *Cephalozia lunulifolia* was found on a rotting log. With few natural rock outcrops, new records quickly dried up and we decided to cut short our visit and move on to the next site. As Sam turned to come back down the slope, he spotted *Jamesoniella autumnalis** at head height on an oak trunk; David found a second colony on another nearby tree. Before we left the site Mark Pool collected *Zygodon rupestris* from a large ash by the road.

Creigiau Ladis (Merched), Mynydd Mallaen (SN7245)

The weather began to deteriorate and the drizzle turned to heavy rain so we took an early lunch in our cars. With the rain still falling, we walked to our next site on the north-western edge of Mynydd Mallaen - an extensive area of upland commonland. Sam separated from the main group to record a blank tetrad on the western edge of the hill. The results were disappointing, with highlights being *Cynodontium bruntonii* and *Zygodon rupestris* in some rather dry woodland, and more *Diplophyllum obtusifolium* on a steep roadside bank.

The rest of the group worked a rather tightly grazed stock-holding area, with both acidic and base-enriched flushes. The most basic flushes had frequent *Drepanocladus revolvens s.str.*, and a small patch of *Scorpidium scorpioides* was also found. *Breutelia chrysocoma* and *Calliargon sarmentosum* were present at the edges of some flushes, and *Odontoschisma sphagni* was creeping over a hummock of *Sphagnum subnitens*. *Oligotrichum hercynicum*, *Dicranella palustris*, *Hyocomium armoricum*, *Racomitrium aquaticum* and *Blindia acuta* were found by a stream, with *Scapania compacta* on nearby boulders.

From this enclosed area we wandered onto the open moorland, heading for an area of massive block screes formed of Silurian conglomerates. As we neared the screes, Jean spotted *Scapania umbrosa** on a small rock amongst *Calluna*, the first confirmed county record since H.H. Knight recorded the species from the same area almost 100 years ago. Graham collected a fragrant *Kurzia* from a nearby heathy bank which Jean later confirmed as *K. trichoclados**. While examining the *Kurzia*, Jean noticed a few stems of *Calypogeia neesiana**, which we had overlooked in the field. This area of block scree is largely inaccessible to sheep, and alongside hummocks of *Bazzania trilobata* were small 'forests' of Fir Clubmoss (*Huperzia selago*) and patches of Wilson's Filmy-fern (*Hymenophyllum wilsonii*). Many boulders supported an abundance of *Andreaea rothii* subsp. *falcata*, various *Racomitrium* species and *Ptychomitrium polyphyllum*. Jean soon found *Anastrophyllum minutum* among the boulders and then located *Lepidozia pearsonii* creeping though pleurocarps, while Graham collected *Kurzia sylvatica* on a nearby peaty overhang. Nigel, who was busy recording rust fungi on vascular plants, found a small patch of Stag's-horn Clubmoss (*Lycopodium clavatum*). Working eastwards through the screes, swelling mounds of *Mylia taylorii* began to appear in quantity and *A. minutum* proved to be quite common. David found *Douinia ovata* on one of the few trees present, a rowan, and another patch was located in deep shade under a massive boulder. Other species recorded in the screes included *Cephaloziella hampeana*, *Tritomaria quinquedentata*, *Bartramia pomiformis*, *Dicranum fuscescens* and *Polytrichum alpinum*.

Sam rejoined us just as the rain was easing off, but now an icy wind had begun to blow, making it feel more like November than July. We moved down to a small disused lead mine and associated spoil heaps. *Barbilophozia attenuata*, *B. floerkei* and *Lophozia bicrenata* were

present, and another *Lophozia* with reddish-brown gemmae proved to be *L. sudetica*. Small tufts of *Grimmia donniana* were growing on some shaley rocks on the spoil heaps, some with their attractive upright sporophytes. Returning to our cars via the lower edge of the common, we crossed a very wet area with *Sphagnum squarrosum* and *S. teres*. The roadsides between the common and the pull-in where our cars were parked produced some useful acrocarp records, including *Tortula truncata*. Sam and Graham independently found a patch of fruiting *Bryum* beneath a galvanised roadside barrier near to our cars which was later confirmed as *B. pallascens*. As most people were damp and cold, we returned to our base to change into some dry clothing rather than go to another site. A total of 153 species was recorded at the site.

Nant y Bai lead mine (SN7844)

Roy and Phil spent much of the day at Nant y Bai lead mine where they hoped to find *Ditrichum plumbicola*, but despite the extensive areas of spoil, the species was absent.

TUESDAY 2 JULY

Bannau Sir Gaer and Llyn y Fan Fach area (SN8021)

The BBS have visited Bannau Sir Gaer (also known as the Carmarthen Fan) on two previous meetings, and so several members opted not to go there on the 'free day'. Despite being relatively well-known, several species recorded from cliffs elsewhere in the Brecon Beacons National Park have not been found at Bannau Sir Gaer, and this seemed adequate justification to revisit the site. Sam and the two Marks were joined by Alex Turner for the day.

After a quick walk up the track to Llyn y Fan Fach, the group searched the lake sides for a *Marchantia*, thought to be *M. polymorpha* subsp. *montivagans*, that Sam and Graham had seen there in August 2001. It was duly relocated but the consensus was that it was just poorly-marked subsp. *polymorpha*. The group then headed for the large gully near the western end of the Old Red Sandstone cliffs as this allowed easy access to higher ledges. Things started very well: plenty of *Schistidium strictum*, *Amphidium lapponicum* and a little *Bryoerythrophyllum ferruginascens* were all noted on base-rich sandstone low down in the gully. Further up were *Pohlia flexuosa* on two gravelly ledges, small patches of *Scapania aequiloba* and *Oedipodium griffithianum*, and a fine stand of *Encalypta ciliata*. A male *Jungermannia* collected near the bottom of the gully proved to be *J. borealis**, a species known previously in south Wales only from Craig Cerrig Gleisiad in Breconshire, some 15 km to the east.

After lunch the group separated and members worked eastwards across the crags at different levels. After the riches of the western gully the bryophytes near the base of the crag were slightly disappointing although *Metzgeria conjugata*, *Plagiochila spinulosa*, *Blepharostoma trichophyllum* and *Grimmia torquata* were all noted for the first time during the day. More exciting were a couple of species collected by Mark Lawley from about halfway up the cliff. *Ditrichum zonatum* var. *zonatum** was new for south Wales, and *Andreaea alpina** was the first vice-county record since H.H. Knight collected it in the far north-east of the county. An odd-looking *Schistidium* bore more than a passing resemblance to *S. frigidum*, but later examination suggested it was just *S. apocarpum* s.str. with eroded perichaetial leaves. Things picked up again as we rounded a corner on to north-east-facing cliffs. The tall-herb ledge communities increased in lushness with Roseroot (*Sedum rosea*) becoming abundant and, below them, in crevices and on vertical rock, the bryophyte interest echoed that of the gully.

Schistidium strictum, *Amphidium lapponicum* and *Bryoerythrophyllum ferruginascens* grew with abundant *G. torquata*; *Isothecium myosuroides* var. *brachythecioides** was also collected here.

The descent from Llyn y Fan Fach was more leisurely than the outward journey and bryophytes growing on and around the track were recorded, the most interesting being *Racomitrium elongatum*, found by Mark Pool. The day ended nicely as Sam located female *Moerckia hibernica* in a base-rich flush near the fish hatchery. *M. hibernica* was first noted during the 1978 BBS meeting and its continued presence at this, one of only two inland sites in south Wales, was heartening. In total, 109 mosses and 34 liverworts were recorded during the day.

Mynydd y Betws (SN6610) and Carreg Cennen (SN6619)

Graham, Jonathan and Lorna opted to visit several unrecorded tetrads on the Carboniferous Coal Measures at Mynydd y Betws, close to the boundary with Glamorgan. The natural habitats proved to be very acidic and the area was possibly the poorest, bryologically speaking, that either Jonathan or Graham had seen in the county. Roadsides and tarmac provided the bulk of the records. The highlights were *Nardia compressa* in one of the streams and a patch of *Climacium dendroides* in a most unlikely spot in the middle of an area of heavily grazed *Nardus stricta*-*Juncus squarrosus* acidic grassland. Lorna found *Atrichum crispum* in quantity in a ditch. Interestingly, the first Carmarthenshire record of *A. crispum* was made in 1877 by the Reverend Augustine Ley near Glynhir Mansion, Ley having family connections with Glynhir.

Jean and Richard visited the Welsh National Botanic Garden. Although no bryophyte list was made, Jean found *Marchantia polymorpha* subsp. *ruderalis* in a pot which had originated from a nursery in north-west Carmarthenshire. Later they visited Carreg Cennen Castle, which sits above Carboniferous Limestone cliffs, where they recorded a variety of calcicoles, including *Preissia quadrata*, *Anomodon viticulosus*, *Ditrichum gracile*, *Eucladium verticillatum*, *Encalypta streptocarpa*, *Tortella nitida* and *Eurhynchium striatulum*.

WEDNESDAY 3 JULY

Carmel Woods National Nature Reserve and surrounding area (SN5815 - SN6116)

Our first stop of the day was a disused Carboniferous Limestone quarry at Pentre Gwenlais, part of Carmel Woods National Nature Reserve (NNR). *Leiocolea badensis* proved to be common in the damper parts of the quarry floor, with *L. turbinata* on spoil heaps at the quarry edge. *Aloina aloides* and *Didymodon ferrugineus* were also present elsewhere in the quarry, the latter becoming locally abundant on the entrance track. Mark Pool spotted *Orthotrichum striatum* on a willow branch overhanging the path we took out of the quarry. Other epiphytes found on nearby trees included *O. affine*, *O. lyellii*, *Ulota bruchii*, *U. crispa*, *U. phyllantha*, *Metzgeria temperata*, *M. fruticulosa*, *Microlejeunea ulicina* and *Radula complanata*. Further up the path there was a large patch of *Campyliadelphus chrysophyllus*, and the first fruiting *Tortella tortuosa* for the county was noted on shaded limestone pavement.

We moved on to a nearby bog, which was notable for its fine stands of Royal Fern (*Osmunda regalis*). The hepatics *Odontoschisma sphagni*, *Cephalozia connivens*, *Kurzia pauciflora* and

Mylia anomala were present on the hummocks, with *Cladopodiella fluitans* common in the pools. *Cephaloziella hampeana*, *Riccardia latifrons* and *Calypogeia sphagnicola** were found in smaller quantity growing through *Sphagnum*. A total of nine *Sphagnum* species was recorded on the bog.

We then crossed the road from where our cars were parked to a partially quarried gritstone ridge. On the footpath both Marks spotted *Archidium alternifolium* and Richard located *Bryum alpinum* complete with tubers. *Lophozia bicrenata* and, rather strangely, *Didymodon ferrugineus* were found on shallow peat in a quarried area. The latter species was thought to be receiving some calcareous influence from tarmac dumped nearby.

Llwynyfran Quarry (SN5715)

Our final stop of the day was a long-disused limestone quarry just to the west of the NNR. After a showery day, some members of the group were starting to flag a little. However, the sun came out, providing perfect conditions for observing the numerous small acrocarpous mosses associated with the quarried areas. Rock faces supported *Bryoerythrophyllum recurvirostrum*, *Zygodon viridissimus*, *Pseudocrossidium revolutum*, *Campylium stellatum* var. *protensum*, *Mnium stellare* and *Schistidium crassipilum*, while damp patches on the quarry floor had *Aneura pinguis*, *Bryum pseudotriquetrum*, *Campyliadelphus chrysophyllus*, *Climacium dendroides* and *Syntrichia ruralis*. A fragment of a discarded pair of trousers was notable for supporting *Ceratodon purpureus*, *Encalypta streptocarpa*, *Rhytiadelphus squarrosus* and *Trichostomum crispulum*. *R. squarrosus* was also observed apparently growing as an epiphyte on a horizontal willow branch. Later microscope work showed both *Thuidium delicatulum* and *T. philibertii* to have been present in the quarry.

Glynhir revisited (SN6315)

We returned to Glynhir for a refreshing cup of tea and afterwards Jonathan set off on his journey home. Sam set up his birding telescope so we could scan the stone tile roofs for the rare *Grimmia* species that are turning up in this habitat all over the Welsh borders. Most tiles were too basic, mainly supporting *G. pulvinata*, but one or two tufts were possibly another *Grimmia* species, and what appeared to be *Racomitrium fasciculare* was also present. A search was made for material that had fallen off the roof, but most was just *Hypnum cupressiforme* s.l. Mark Lawley, Sam and Graham then recorded in the grounds of Glynhir before dinner, adding to the records made on the first day and completing cards started the previous day by Jonathan and Lorna. Some walls had abundant *Tortella nitida*, and elsewhere *Homalia trichomanoides*, *Mnium stellare* and *Leptodictyum riparium* were found.

THURSDAY 4 JULY

Fedw Fawr and the Afon Clydach (SN7922 - SN8122)

When the meeting was being planned it had been intended to spend this day in south-east Ceredigion, but a pre-meeting visit to check out the area showed that there was an excessively long walk to get to any decent habitat. Therefore an alternative location on the Old Red Sandstone and similar Silurian sandstones in the easternmost part of Carmarthenshire was chosen. We were joined on the day by Ray Woods, bryophyte recorder for Breconshire.

Our target area for the day was the steep-sided valley of the Afon Clydach, which, as far as we know, has never previously been visited by a bryologist. We parked our cars and walked all of 20 m to examine the banks alongside the uppermost reaches of the River Usk. Sam quickly found *Blasia pusilla* amongst some gravelly turf and *Fossombronina incurva* soon followed. Everyone gathered around to see these species when Sam struck gold with *Haplomitrium hookeri**. Not to be outdone, Ray waded across the stream into Breconshire (VC 42) and found *Blasia* and *Haplomitrium* in similar habitat; Graham joined him and located some *F. incurva**. Several samples of what looked like *Riccardia incurva* in the field were later confirmed microscopically as just being highly canaliculate *R. chamedryfolia*. These species alone seemed to justify the change of venue, but this was just the start of what was to prove to be a consistently interesting day. Some flushed ground adjacent to the stream held *Drepanocladus cossonii*, *Warnstorfia exannulata* and *Hamatocaulis vernicosus*, allowing a comparison of the different field characters of each species. *Calliergon giganteum* was present in a more basic flush, *Jungermannia exsertifolia* subsp. *cordifolia* was recorded in a wet runnel, and *Scapania scandica* grew on a crumbling bank above the flushes. As we headed northwards, hummocks of *Polytrichum strictum* were frequent on the moorland, and some large Old Red Sandstone boulders scattered across the moor yielded *Pterogonium gracile*, a rare plant in the county. Richard Fisk checked a nearby conifer plantation and found *Plagiothecium curvifolium*, a species which has undoubtedly been overlooked in Carmarthenshire. After a brief lunch stop we made our way through rush-dominated vegetation where *Plagiomnium ellipticum*, *Calliergon cordifolium* and *Sphagnum squarrosum* were common.

Some low crags on the approach to the Afon Clydach valley yielded *Lophozia excisa*. Sam spotted some south-facing rock outcrops several hundred metres away and thought they looked worth checking for *Hedwigia*. His hunch paid off and he found abundant *H. stellata*, one of only three known sites for the species in the county. We descended into the valley, which proved to be ungrazed and wooded on the western side and grazed and open on the eastern side, thereby providing contrasting habitats. Graham found a rock face with abundant *Porella arboris-vitae*, a few large tufts of *Plagiochila bifaria* (*P. killarniensis*) and Wilson's Filmy-fern (*Hymenophyllum wilsonii*). Part of the group clambered up some shaded crags and found *P. spinulosa*, *P. punctata* and much more *P. bifaria*. Further along the stream, as Mark Lawley puzzled over an odd-looking *Encalypta* specimen from one side of a large boulder, Sam spotted a few plants of *E. ciliata* with capsules (at only 280 m altitude) on the opposite side, allowing us to confirm that the plant Mark was examining was just *E. streptocarpa*. A while later Sam located only the second modern county record of *Philonotis arnellii* on a crumbling slope. Other species recorded along the valley included *Bartramia pomiformis*, *Blepharostoma trichophyllum*, *Preissia quadrata*, *Ptilidium ciliare*, *Scapania gracilis*, *Tritomaria quinquedentata*, *Tortula subulata* var. *graeffii*, *Fissidens rivularis*, *Hygrohypnum ochraceum*, *Cynodontium bruntonii* and *Anomobryum julaceum*.

We climbed out of the valley and headed back across the moor towards the cars, stopping at Mawnbwll-du Mawr, a small fenced-off area of bog which, according to Ray, had large patches of bare peat before it was fenced about 20 years ago. No bare peat is visible today and there is a reasonable cover of *Sphagnum* across the mire surface. Sam located a small hummock of *S. magellanicum*, only the second county record, near the west end of the bog. A range of hepatics similar to that found on Wednesday was present, including *Mylia anomala*, *Odontoschisma sphagni*, *Kurzia pauciflora*, *Riccardia latifrons* and *Cladopodiella fluitans*. Some of the group followed the flush leading out of the bog, which rapidly turned from acidic

to basic, and found a few species new for the day, including *Scorpidium scorpioides*. With the car almost within touching distance Mark Pool rounded the day off nicely with *Dicranella cerviculata** on peaty banks, the first post-1950 record of the species in the vice-county. The total of 150 mosses and 61 liverworts was remarkable considering the uniform geology of the area.

FRIDAY 5 JULY

Nant y Rhaeadr (SN7543)

After the success of Thursday it was felt that the planned trip to some completely unknown country to the north of Carmarthen town might be an anticlimax. Instead, the group were keen to investigate sites in the north-east of the county which we had been unable to visit on Monday. Our first site was Nant y Rhaeadr, a valley situated on Silurian sandstone and shales, with oak woodland, cascades and waterfalls on the south-east flank of Mynydd Mallaen. Despite the reasonable weather forecast it was drizzling and, for the first time during the week, midges were out in force. We walked along a track through Cwm y Rhaeadr plantation where *Archidium alternifolium* and *Bryum alpinum* were growing on the track and more *Plagiothecium curvifolium* was under the conifers. *Diplophyllum obtusifolium* was again found on crumbling banks - this supposedly scarce species is proving to be widespread in the county. The rain had raised water levels in the river and the waterfall and cascades looked particularly attractive. *Scapania gracilis* was common on boulders and tree trunks, some fallen trees were covered in *Nowellia curvifolia*, the woodland banks had frequent *Sphagnum quinquefarium*, and here and there were small pockets with *Saccogyna viticulosa*. Jean worked the lower part of the falls where she found *Marsupella emarginata* var. *aquatica* and *Jungermannia hyalina*. Most boulders and outcrops were quite acidic and had a rather limited flora. However, *Plagiochila bifaria* and *P. spinulosa* were present, and there were small quantities of *Pohlia elongata*, *Rhabdoweisia fugax*, *Isopterygiopsis pulchella*, *Diphyscium foliosum* and *Metzgeria conjugata*. *Plagiochila punctata* was spotted on an oak tree and Mark Pool found *Marsupella funckii* and *Racomitrium affine* at the head of the valley.

Nant Melyn (SN7246)

Lorna departed for home and the rest of us drove to Nant Melyn, an oak-covered ravine woodland on Silurian sandstones opposite the north side of Mynydd Mallaen, stopping briefly on the way to examine a footbridge on which grew *Bazzania trilobata* and *Odontoschisma denudatum*. As we entered Nant Melyn, *B. trilobata* proved to be abundant on the western slopes. Several of us searched fallen logs for *Anastrophyllum hellerianum*, which is known from the site, and eventually Graham found it in very small quantity on a single log. Other species on fallen logs included *Cephalozia lunulifolia*, *Tritomaria exsectiformis* and *Dicranodontium denudatum*. Sam worked his way up the stream and examined the outcrops on the eastern side of the valley. More *Plagiochila punctata*, *P. spinulosa* and *Metzgeria conjugata* were located, as well as three patches of *Sphenolobopsis pearsonii*, a second locality for a species found for the first time in the county only a few months earlier. A small patch of *Jungermannia* was collected and found to be a male example of dioicous *J. paroica*! Other species recorded in the valley bottom included *Lejeunea patens*, *Campylopus fragilis* and *Fontinalis squamosa*. Jean, Mark Lawley and Richard followed a path which took them around the head of the valley and down the eastern side, where Mark located *Marsupella funckii* next to the track. In an area of sprayed bracken, Richard found *Polytrichum*

*longisetum**, another first modern Carmarthenshire record, which rounded off a most enjoyable week. Most of us were rather damp, and we made our way to Llandovery for a well-earned cup of tea, to reflect on the week and nurse our midge bites.

POSTSCRIPT

The meeting exceeded all the local bryologists' expectations and we found many of the target species we had hoped for and a few more besides. Apart from the peacocks, Glynhir proved to be a suitable HQ. Judging by the questionnaire we were asked to fill in at the end of our stay, the new management is well aware of the avian situation. Although on several days the weather was rather poor, the damp conditions meant that most bryophytes appeared nice and fresh, and we certainly saw many more species than we would have had it been hot and dry. Over the week we saw 253 moss and 107 liverwort species, representing 62% and 68% respectively of the known Carmarthenshire flora. Nine species and varieties were recorded new to VC 44 (and one for VC 42), and four old records were updated.

During the week several members of the group helped to fill in recording cards and gave use of their cars, which was most appreciated. We thank Richard Pryce for arranging the visit to Pendine, Nigel Stringer for helping arrange access to some of the sites, and all the landowners who kindly gave permission for us to wander freely across their land.

GRAHAM MOTLEY, SAM BOSANQUET & JONATHAN GRAHAM

AGM AND BRYOLOGICAL SYMPOSIUM 2002, EDINBURGH

The Annual General Meeting and Bryological Symposium were held in Edinburgh on 13-15 September, with Dr David Long as local secretary. This was the first autumn meeting to have been held in Scotland. Participants were housed at the Pollock Halls of Residence, close to Arthur's Seat, and several members took the chance to visit this classic bryological site to see *Coscinodon cribrosus* on Samson's Ribs. On Friday 13 September the afternoon and evening were occupied by meetings of the Conservation and Recording Committee, Publications Committee and Council. Participants also took the chance to socialise in the Conservatory of the John McIntyre Centre.

On the morning of Saturday 14 September a bus transported participants across Edinburgh to the Royal Botanic Garden (RBGE), where we were welcomed by Dr Mary Gibby, the Director of Science, who outlined some of the current activities of the RBGE in cryptogamic botany and bryology. She also described the excellent research facilities at RBGE for bryology, including the bryophyte herbarium and library, which are available for consultation by BBS members.

BRYOLOGICAL SYMPOSIUM

The Symposium was chaired by the President and six presentations were made. During the lunch break a short tour of the RBGE bryophyte herbarium was led by David Long and Sally Rae, who had laid out a selection of specimens from the bryological collections: specimens from R.K. Greville's herbarium, including some original paintings of mosses (e.g. *Aplodon*

wormskioldii); some historical type specimens, such as mosses collected in New Zealand in the late 18th century by Archibald Menzies, including many types which are being curated and databased; and recent acquisitions, such as a collection of British mosses made by H.N. Dixon, and specimens from the herbaria of Jean Paton, Cliff Townsend and Alan Crundwell.

DR MONTERRAT BRUGUÉS (Autonomous University of Barcelona, Spain): *The Bryophytic Richness of Spain*

The Spanish bryoflora consists of 807 moss species, 256 liverworts and five hornworts. The number of bryophytes, and particularly mosses, recorded from Spain has recently increased considerably in parallel with the increase in the number of researchers, and especially due to the study of arid zones, of great interest but little known until now. These zones have yielded the majority of the species new to science, although there are regions where much greater study is required than that undertaken to date.

Climatic variety, accompanied by altitudinal differences within the Spanish territory, determines the interesting and diverse bryophyte flora. The flora includes arctic-alpines, characteristic of the higher areas of the Pyrenees, such as *Gymnomitrium corallioides*, *Marsupella brevissima* and *Pleurocladula albescens*, or such as *Anthelia juratzkana* and *Amphidium lapponicum* which are also found in the Sierra Nevada, species with oceanic distributions, such as *Sphagnum pylaerii*, *Jubula hutchinsiae* and *Breutelia chrysocoma*, and steppe species characteristic of arid, continental zones, such as *Crossidium aberrans*, *C. seriatum*, *Tortula revolvens* var. *obtusata* and *Phascum vlassovii*.

There are about 20 Iberian endemics, including *Triquetrella arapilensis*, *Anomobryum lusitanicum*, *Schizymenium pontevedrensis*, *Pterygoneurum sampaianum* and *Phascum cuynetii*. Some of these, such as *Acaulon casasianum*, *Didymodon bistratosus*, *Orthotrichum ibericum* or *Phascum longipes*, may eventually be found in other Mediterranean countries, as is the case with *Acaulon fontiquerianum* and some *Orthotrichum* species, or else in the Canary Islands, as with *Goniomitrium seroi*. Mediterranean endemics and Iberian Macaronesian endemics are also abundant. The catalogue also contains species with interesting disjunctions in their distributions, such as *Oedipodiella australis*, *Antitrichia californica*, *Claopodium whippleanum*, *Schistidium occidentale* and *Phascum piptocarpum*.

DR HEINJO DURING (University of Utrecht, The Netherlands): *The Diaspore Bank of a Zimbabwean Savannah*

The ‘Matopos Sandveld Fire Plots’ in the savannas of south Zimbabwe are experimental plots with a consistent management (12 different regimes) since 1947. The above-ground vegetation appears to contain few bryophytes: in February 1997, in the middle of the rainy season, only isolated plants of *Exormotheca holstii*, two *Riccia* species, two *Archidium* species and a *Bruchia* were found. However, from superficial soil samples taken in plots with four different management regimes, including annual fire, at least 11 liverworts and hornworts and 21 mosses emerged, often in large numbers. Many of the species found are hypothesised to possess an ‘episodic’ strategy much like that described for *Physcomitrium sphaericum*. Perhaps for that reason, the assemblage contained several species new to Zimbabwe or new to Africa, including *Micromitrium tenerum*, and at least one taxon new to science: *Neophoenix matoposensis* R.H. Zander & During *gen. et spec. nov.* Annual burning of the above-ground vegetation did not appear to be harmful to the diaspores in the soil.

DR ANGELA E. NEWTON (Natural History Museum, London): *Mosses of the Maya Mountains: Research and Exploration in Central America*

The Neotropical area, including Mexico, Central America, the Caribbean and northern South America, is probably one of the better known tropical regions for bryophytes, since there are now several complete or partial floristic works available. There is also a significant number of national and international researchers working on the floristics and systematics of bryophytes in the region. However, there are still enormous gaps in our knowledge of the distribution of mosses and liverworts in most of the countries involved, and many of the taxa are poorly understood, so that a large amount of research is still necessary.

Key biodiversity issues include a) cataloguing what is present, b) providing 'quality control' for names so that databases contain meaningful information, c) investigating the natural distribution and ecological associations of bryophytes before too much more of this information is destroyed by development, and d) developing keys, guides and inventories to enable ecologists, conservationists and others to undertake research and implement management plans. Systematic taxonomic revisions are necessary to provide a better estimate of the number and nature of species and higher level taxa in the area, and to provide a basis for evolutionary and biogeographical research into the processes influencing the origin and maintenance of biological diversity.

One of the countries in this area that is very poorly known is Belize, on the southern side of the Yucatan Peninsula between Mexico, Guatemala and the Caribbean. It is mostly lowland, but in southern Belize there is a large limestone and sandstone plateau with some peaks reaching over 1000 m (Doyle's Delight is the highest point at 1140 m). There have been few visits by bryologists to the country, possibly because the low altitudes promise little diversity in contrast to the high peaks in adjacent areas. Recent checklists give 250 species of moss (Townsend & Allen, 1998) and 65 species of liverwort (Whittemore & Allen, 1996). In connection with other bryological research projects, Fred Rumsey and I undertook to survey the bryophytes around the Las Cuevas Research Station, which is run jointly by the Natural History Museum, London and the Forestry Department of Belize. The area around the station is rather uniform, being situated in mature secondary forest on the limestone plateau at about 450 m, surrounded by numerous small hills rising to 800 m. There is little surface water in the immediate area, but frequent heavy rain and overnight mist are conducive to bryophyte growth.

Preliminary results from our three-week visit produced a list of 132 moss species and at least 43 hepatic species. This represents 32% of the Townsend & Allen (1998) moss list, but with at least 19 additional species and five additional families. The liverworts collected have only been partially identified, but represent 44% of the genera in Whittemore & Allen (1996), with at least 14 additional genera. Interesting moss taxa new to the country, although common elsewhere in the neotropics, include Cryphaeaceae (*Schoenobryum concavifolium*), Anomodontaceae (*Anomodon rostratus*, *A. attenuatus*) and Fabroniaceae (*Fabronia ciliaris* var. *polycarpa*). In the liverworts, a large number of epiphyllous taxa were collected, including representatives of the genera *Aphanolejeunea*, *Colura* and *Leptolejeunea*. Terrestrial taxa included Marchantiaceae (*Marchantia*, *Dumortiera* and *Asterella*), *Aneura*, and also the hornwort *Notothylas*.

This number of additional taxa found in the course of a short visit to a rather uniform area indicates that the bryoflora of Belize is still far from completely known, and that additional visits here, especially to a range of different habitats and altitudes, are likely to produce additional records. The liverworts in particular would repay further work.

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PROF. JEFFREY G. DUCKETT (Queen Mary College, University Of London) & PROF. ROBERTO LIGRONE (Seconda Università Di Napoli, Caserta, Italy): *What we Couldn't Have Done if we'd Stayed in Europe: Selection and Serendipity in the Southern Hemisphere!*

We are indebted to David Long for dreaming up the exploration theme for the 2002 BBS Symposium and for inviting us to speak. This has provided a unique opportunity to pause and to reflect on the various fruits of our visits, over the last decade or so, to Lesotho, South Africa, Borneo, Uganda and New Zealand. This turns out to be a curious tale of setting out with one set of objectives and discovering very different things.

The first question that immediately comes to mind is: why should two botanists, whose research can best be described as the cell, developmental and evolutionary biology of bryophytes (with a bit on the side on protonemata and bryological exploration of uncharted territories (Hodgetts *et al.*, 1999)), want to travel to the southern hemisphere in the first place?

Together, Britain and Italy have remarkably good bryophyte floras for our kind of work; most groups are well represented and can be fixed immediately after collection. The most notable lacunae are *Takakia*, giant members of the Polytrichales (*Dawsonia*, *Dendroligotrichum*), Schuster's primitive metzgerialean taxa (*Treubia*, *Phyllohallia*, *Allisonia*, *Verdoornia*) and those with highly differentiated gametophytes (*Symphyogyne*, *Hymenophyton*), *Monoclea* and *Neohodgsonia* in the Marchantiales, only one species of *Haplomitrium*, and the hornwort genera *Dendroceros* and *Megaceros*.

Thus in the mid 1990s we set off to Lesotho to study the ontogeny of the water-conducting cells in *Symphyogyne* and to make comparative observations on fungal endophytes in the Marchantiales. The discovery that the formation of the large pits in the former is associated with callose (Ligrone & Duckett, 1996), a capricious carbohydrate better known in association with phloem sieve plates in angiosperms, was the catalyst for wide-ranging comparative studies on water-conducting elements in bryophytes. Ultimately, this has led to the conclusion that these conduits are polyphyletic in both liverworts (Calobryales, Metzgeriales) and mosses (*Takakia*, Bryales and Polytrichales) (Ligrone *et al.*, 2000, 2002). Developmental and, most recently, immunocytochemical evidence that moss hydroids are not homologous with tracheary elements has major implications for interpreting vascular plant lineages.

From the same expedition the chance observation that the central thallus cells in *Asterella* contain longitudinal arrays of endoplasmic microtubules associated with a pleomorphic vacuole system (Ligrone & Duckett, 1994a) caused us to re-examine the cytology of food-

conducting leptoids in mosses (Ligrone & Duckett, 1994b). This highly characteristic 'food-conducting cytology' has now been found, not only in polytrichalean leptoids, but also in other mosses such as Neckeraceae, Orthotrichaceae, Hookeriaceae and most notably *Sphagnum* (Ligrone & Duckett, 1998), previously thought to lack specialised conducting elements. It also occurs in moss caulonemata and rhizoids (Duckett *et al.*, 1998), in the axes of *Takakia* and *Haplomitrium*, and is widespread in the thalli of Marchantiales.

Our studies on conducting elements have extended to a re-examination of the possible functional significance of dimorphic rhizoids in the Marchantiales, apparently last studied by Kamerling (1897). Whereas smooth rhizoids are living and frequently contain hyphae of the fungal endophytes, the pegged variety are dead and function as an internalised, external water-conducting system in carpocephala grooves. The pegs prevent total collapse when the thalli dry out and permit recovery after rehydration. The absence of pegged rhizoids in *Monoclea*, *Neohodgsonia* and some aquatic *Riccia* species suggests that this is a derived condition - a conclusion in line with recent molecular evidence (Wheeler, 2000) but at variance with earlier Schusterian notions.

One of our principal original aims was the exploration of fungal endophytes in hepatics (Read *et al.*, 2000). While some of our observations have been closely in line with predictions (e.g. the widespread occurrence of Endogonaceae in the Marchantiales, including *Monoclea*), others were unexpected, for example fungi in the rhizome systems of the Pallaviciniaceae. Most remarkably, the thalli of *Treubia* contain both extracellular and intracellular endogaceous fungi, and the same are confined to the outer cell layers in the mucilage-invested 'roots' of *Haplomitrium*.

This distillation of some of the cytological gems originating from the southern hemisphere is just a preliminary progress report of the results from our travels. Just as floristic collecting expeditions result in hundreds of specimens requiring many years to identify, ours produce dozens of resin-embedded specimens - the bryological equivalent of sculptures waiting to be carved. So, when asked where we might go next, the answer should really be 'absolutely nowhere - not until we've looked at most of what we've got already'. Nearing the top of the pile are investigations into the ontogeny of stomata and intercellular spaces in hornworts and mosses. Just as hydroid/tracheid homology was a key question in moss-tracheophyte evolution, monophyly versus polyphyly of stomata has now become the vexed issue in setting the basal lineages of land plants (Raven, 2002).

We thank the British Council, The Royal Society and the Natural Environment Research Council without whose financial support this work would not have been possible. Equally crucial have been laboratory facilities at the Universities of Lesotho and Canterbury, Christchurch, New Zealand, and the camaraderie of the worldwide bryological community who shared experiences including men with guns, bribery of officials, life-threatening weather, kea-damaged cars, and a universal hatred of possums in New Zealand.

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DR MARK HILL (Centre for Ecology and Hydrology, Monks Wood, Huntingdon) & BRYAN EDWARDS (Dorset Environmental Records Centre, Dorchester): *A Very Slow Exploration: 40 Years of Bryology in Dorset, England*

Physical background

Dorset (Watsonian vice-county 9) is on the south coast of England, just west of the line separating English Nature's South-West region from the South-East region. It measures about 80 km from east to west and 60 km from north to south. Topographically, it is dominated by a ridge running south-west to north-east. The highest hill, Pilsdon Pen, is 277 m high. Geologically, the county is underlain by relatively young rocks, mostly of Jurassic and Cretaceous age. Tertiary sands, clays and gravels characterise the Poole Basin, an area of heathland on acid soils in the south-east near Poole. Annual rainfall is lowest on the coast, being 700 mm on Portland, rising to about 1300 mm on the chalk ridge.

Progress of recording

Mark Hill became interested in bryophytes in 1962 when he began recording them in the west of the county near Wootton Fitzpaine. Initially, his aim was to learn to identify the species and to record them in west Dorset for the newly-launched BBS Mapping Scheme. During the following 40 years, the project transformed itself gradually from a local flora of the west of the county (1966), via a flora of the whole county, based on 10-km squares (1970), to a tetrad flora (1995). BBS meetings were held at Lyme Regis (1969), Wareham (1977) and

Weymouth (1995). During the 1970s, Monica Milnes-Smith recorded bryophytes extensively near Child Okeford. In the 1980s, Rod Stern sent numerous records from the east of the county. In the 1990s, Bryan Edwards became active and kept systematic records from sites all over the county. In 1995, he and Mark Hill decided to pool their records and (finally) to write up a bryophyte flora of the county. This is due to be published by Dorset Environmental Records Centre as a book.

In the 1960s there was already a long history of recording in the county, starting with *Leptodon smithii*, found at Weymouth in 1800. There was no further activity until 1867, but thereafter mosses were recorded rapidly, with half the moss flora discovered by 1890. Liverworts trailed and did not reach the halfway mark until 1935. Notable finds during the 19th century were *Myrinia pulvinata* (1879), *Sphagnum pulchrum* (1880) and *Eurhynchium meridionale* (1881). The discovery of *E. meridionale*, one of only two bryophyte species confined in England to Dorset, was delayed because E.M. Holmes misidentified it as *E. striatulum*. Its other finder, Sir William Medleycott, got a correct identification from H.H. Wood, but Wood died shortly afterwards and the record did not come to light until 1917. From that time onwards, bryologists have regularly visited Portland, where *Southbya nigrella* was found new to Britain in 1921.

During the 1930s, Eustace Jones recorded bryophytes on Studland Heath and in several woods. Many of his best discoveries were liverworts, including *Jungermannia hyalina*, *Lophozia incisa*, *Marsupella funckii* and *Riccia huebeneriana*, which have never been refound. Since 1945, many other interesting plants have been added to the county list, of which *Plagiochila norvegica* must surely be the most remarkable. It is known nowhere else in Britain, and in Dorset is confined to a single stone.

Composition of the flora

With 95 liverworts, three hornworts and 329 mosses, the Dorset bryophyte list comprises about 42% of the British and Irish total. Arctic-montane species are completely lacking, but there are 18 Boreal and Boreo-arctic montane species, including both calcicoles, such as *Leiocolea badensis* and *Thuidium abietinum*, and calcifuges, such as *Calypogeia sphagnicola* and *Pogonatum urnigerum*. In comparison with the average British county, Dorset has more Mediterranean-Atlantic and Submediterranean-Subatlantic species than the average, with 65% of the total.

The most similar vice-county is South Hampshire (VC 11), which has a nearly equal number of species. Among the species that occur in Dorset but not in any adjacent county, perhaps the most surprising is *Sphagnum pulchrum*. It is common in Dorset but does not quite reach the Hampshire border. *Myrinia pulvinata* and *Weissia rostellata* are also not known from any adjacent counties but are more widespread in England. In the other direction, *Campylophyllum calcareum* and *Orthotrichum stramineum* are known from all six adjacent vice-counties but not from Dorset.

Changes in the flora

There are just five recorded aliens in the Dorset bryoflora. *Campylopus introflexus*, now very common on heathland and occasional elsewhere, was first found in 1950. *Orthodontium lineare* was found in 1961 but has remained uncommon. *Didymodon umbrosus*, *Lophocolea*

bispinosa and *Telaranea murphyae* were discovered in the last 15 years. Only *L. bispinosa* appears likely to become common. It is confined to sites disturbed by quarrying or military activity, and has also been found in adjacent parts of Hampshire.

A few species appear to be increasing, but older records are not in the main good enough for us to be certain. *Didymodon nicholsonii* was first found in 1980 but was not seen again until 2000. It now appears to be common in the county, especially on tarmac in villages. Although it is rather inconspicuous, it would almost certainly have attracted our attention if it had been common in the past. Likewise *Cololejeunea minutissima*, now found frequently inland, was formerly almost confined to the coast.

A rather larger number of species appear to be declining. Some, such as *Bartramia pomiformis*, *Dicranum spurium* and *Splachnum ampullaceum*, are generally decreasing in southern England. More surprising are *Plagiothecium denticulatum* and *Pohlia nutans*, which were frequently found in the 1960s, but since 1980 have been seen in only seven and three tetrads respectively. At least seven species are thought to have been short-persisting casuals in the county. Notable among these are *Riccardia palmata* and *Scapania gracilis*, found in 1970 on rotting wood in a small wetland called Aunt Mary's Bottom. *R. palmata* was refound in 1972 but neither species has been seen thereafter in spite of searching.

Far more species appear to have been stable than to have increased or decreased. This is partly due to the efforts of conservationists. Much of the coast has been acquired by the National Trust, and many heaths now have statutory protection. Epiphytes were little affected by acid rain, even when it was at its height in the 1960s. Thus, we see at the present a flora which in its general character is remarkably similar to that which existed when H.H. Wood began systematically to record mosses in 1876.

GORDON ROTHERO (DUNOON, ARGYLL): *Exploration at the Gallop: 10 Years of Bryology in Assynt, Scotland*

Assynt is a parish in Sutherland, in the far north-west of Scotland, botanically best known for the interesting vascular plant flora on the outcrops of Cambrian limestone at Inchnadamph. You need to think big for parishes in the Highlands: Assynt is slightly larger than the Isle of Wight and even so is not the largest parish in Sutherland. Other comparisons with the south also shed light on the nature of the area. The Isle of Wight has a population of some 130,000 and hundreds of roads criss-crossing the landscape; Assynt has about 1000 people and one main road through the middle and a minor road around the coast. The area is very rugged with spectacular hills like Suilven and Quinag and ground over 950 m on Conival, but much of the ground is an undulating plateau with a myriad of crags, lochans and wooded ravines. The coast is wild out on the Point of Stoer but there are shell-sand bays and quiet coastal woodland as well. The climate is extremely oceanic: wet and mild in the winter and wet and slightly warmer (if you are lucky) in the summer.

The Assynt area, and particularly the limestone, has attracted botanists over the years - the first bryophyte records date from 1767 - but recording has always come from fleeting visits, so the total number of records before my survey was surprisingly small. The survey which culminated in the bryophyte section in the *Flora of Assynt* (Evans *et al.*, 2002) grew out of records made during the BBS visit in 1992 and the friendship I struck up with Pat and Ian Evans who live in the Assynt township of Nedd. Pat and Ian had already embarked on survey

work for their vascular plant flora and, with fieldwork scheduled to end in 2000, a tight timetable was set in an attempt to cover at least a representative sample of the 164 tetrads in the parish. In the end, 116 tetrads had some sort of survey but the vast majority had just the one visit.

The area has a rich bryophyte flora with 156 liverwort and 345 moss taxa. In addition to this there are some 14 liverworts and 20 mosses reliably recorded for Assynt which were not refound during this survey.

The limestone, centred on Inchnadamph, has a number of interesting species, notably an abundance of *Orthothecium rufescens* and a number of other uncommon montane species at low altitude, including *Pseudoleskeella rupestris*, *Encalypta alpina*, *Schistidium trichodon* and *Hypnum bambergeri*. Dripping limestone also has stands of *Seligeria trifaria* and *Hymenostylium insigne*. There are surely more good discoveries yet to be made on the limestone.

Away from the limestone, much of the ground is rather unproductive wet heath with large populations of *Campylopus atrovirens* and *Pleurozia purpurea*, but there are also more undisturbed mires. There are a number of populations of *Sphagnum austinii* and *S. fuscum*, and species such as *S. molle* and *S. strictum* are probably more frequent than this survey suggests. My survey found only one stand of *Campylopus shawii*; this seems unlikely to reflect reality, though it is undoubtedly rare. The most important heath community is found under ericaceous shrubs at moderate to high altitudes on shaded slopes and amongst scree. Here there is an oceanic-montane liverwort community, usually associated with *Sphagnum capillifolium* and *Racomitrium lanuginosum*, composed of robust species with extraordinarily disjunct global distributions and including *Anastrophyllum donnianum*, *A. joergensenii*, *Scapania ornithopodioides*, *S. nimbosea*, *Plagiochila carringtonii*, *Mastigophora woodsii*, *Bazzania pearsonii* and *Herbertus aduncus* subsp. *hutchinsiae*.

The woodland and ravines also have an excellent oceanic flora with a good development of the *Scapania gracilis*-*Hymenophyllum wilsonii* community on rocks, large stands of *Plagiochila spinulosa* and *P. punctata*, and less frequent, but often large, stands of *Lepidozia cupressina*. The smaller Lejeuneaceae are also well represented with an abundance of *Lejeunea patens*, and with *Drepanolejeunea hamatifolia*, *Colura calyptrifolia*, *Aphanolejeunea microscopica* and *Harpalejeunea molleri* all reasonably frequent. The smaller scale of the woodland and the northerly latitude seem to result in the absence of some of the rarer oceanic species that occur on Skye although there is one population of *Geocalyx graveolens*.

Because much of the survey work took place in the winter months, the highest hills have not had as good a coverage as they justify. Some arctic-alpine species have already been mentioned as occurring on the limestone. There are also records for *Arctoa fulvella*, *Kiaeria blytii*, *Philonotis seriata* and *Ditrichum zonatum* var. *zonatum*, and there are older records for *K. falcata* and *Aulacomnium turgidum*. After the flora was published, one trip to the hills north of Conival this year produced *Barbilophozia lycopodioides* and *Paraleucobryum longifolium*, indicating that there is much still to be found. Craggs lower down can also have an interesting flora, with *Glyphomitrium daviesii* proving to be frequent on the gneiss; there are a few oddities such as *Cynodontium jenneri* and *Dicranoweisia crispula* here as well. Rock exposures by the many lochs have an interesting bryophyte community with several localities for *Grimmia longirostris* and a few sites for *G. ovalis*, as well as more common plants such as

Pterigynandrum filiforme, *Orthotrichum rupestre* and *Antitrichia curtispindula*. Many lochs also have good populations of *Odontoschisma elongatum* along the flushed margins, and two lochs on the limestone have large stands of *Cinclidium stygium* in the same habitat.

The riparian flora, particularly where the run-off is from the limestone, is also interesting, and includes *Hygrohypnum duriusculum* and *Rhynchostegiella teneriffae*, usually with abundant *Rhynchostegium riparioides*, *Thamnobryum alopecurum* and *Cinclidotus fontinaloides*. On the gneiss, one fall has good populations of both *Schistidium agassizii* and *Bryum dixonii*, and on the sandstone there are at least two populations of *Rhynchostegium alopecuroides*.

The coastline is extensive and varied; where it is sheltered and wooded there are often similar oceanic species to the ravines with the addition of large stands of *Frullania teneriffae* and occasional *F. microphylla*. On the exposed Stoer peninsula, pride of place goes to the few stands of *Myurium hochstetteri*, a very beautiful hyper-oceanic species here in one of its few mainland localities. There are shell-sand beaches at Achmelvich, Clach toll and Clashnessie, and these have some species typical of western dune systems, including *Ditrichum gracile*, *Entodon concinnus*, *Didymodon ferrugineus*, and occasionally *Amblyodon dealbatus*, *Encalypta rhaptocarpa* and *Distichium inclinatum*.

There are lots of holes still to be filled in Assynt and I suspect that more rare species will be found on the limestone. A number of species recorded by H.N. Dixon, W.E. Nicholson and E.S. Salmon on their visit in 1899 have not been refound, and the bigger hills need more attention. And this is just one of Sutherland's parishes.

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CONVERSAZIONE

Following the AGM, delegates were transported back to Pollock Halls by bus, and after dinner a conversazione was held in the Conservatory where the following exhibits and posters were displayed:

- Martin Wigginton, Roy Perry and Herman Stieperaere: progress with the *E.W. Jones Liverwort Flora of Tropical West Africa*
- Prof. J.G. Duckett (Queen Mary College, University of London): protonemal gemmae in cultures of *Zygodon gracilis*
- Mark Lawley (Ludlow): the Shropshire bryoflora
- Karma Wangchuck (RBGE): taxonomic revision of Himalayan Pterobryaceae
- Jane Burch (Royal Botanic Garden, Kew): the *ex situ* Bryophyte Conservation Project
- Gill Stevens (Natural History Museum, London): the BBS Arable Bryophyte Survey
- Liz Kungu (RBGE): bryological field work in Scotland, 2002
- Daniela Schill (RBGE): collection of *Anastrophyllum* in Scotland and Norway, 2002

The Annual General Meeting of the Tropical Bryology Group, chaired by Michelle Price, was held later in the evening.

FIELD EXCURSION TO EAST LoTHIAN COAST, 15 SEPTEMBER 2002

The morning excursion, led by David Long and Gordon Rothero, was to the John Muir Country Park near Dunbar (VC 82), a Local Nature Reserve managed by East Lothian District Council. It was set up to commemorate John Muir, a native of Dunbar, who after emigrating to America as a child became one of the most celebrated leaders of the environmental movement in the USA and was instrumental in setting up national parks such as Yosemite. The park includes areas of saltmarsh, sand dunes and pine plantation. Members arrived from Edinburgh by private car and the RBGE minibus. In spite of a threatening bank of mist out at sea, the weather was mild and dry and perfect for bryology.

The group first explored the saltmarsh and admired a robust stand of *Bryum marratii*, only recently discovered here, then fanned out to search for *B. warneum*, which was located but producing only a few of its distinctive sporophytes. More abundant were *B. algovicum* var. *rutheanum* and *Hennediella heimii*. Jonathan Sleath found *B. dunense*. Later the group split up. Some people strode out to the mouth of the Hedderwick Burn, where Mark Hill recorded *Racomitrium elongatum*; others explored the dune ridge, where *Rhytidium rugosum* was locally abundant and *Campyliadelphus elodes* was seen in its well-known site in calcareous ditches at the edge of the conifer plantation.

Lunch was taken in a large circle on the grass, and then we moved a few miles up the coast to North Berwick Law which is one of several volcanic plugs in East Lothian (others include the Bass Rock and Traprain Law) but is still inadequately known bryologically. The steep north-facing rocks were an immediate challenge to a few, who looked disapprovingly down on the majority who had opted to explore an adjacent stubble field, spurred on by Mark Hill to record the first Scottish arable field for the BBS 'Survey of Bryophytes of Arable Land'. The field turned out to be of some interest. The most abundant moss was *Dicranella schreberiana*, and among the other species recorded were **Bryum violaceum* (Mark Hill and Chris Preston), **B. tenuisetum* and *Tortula modica* (Jeff Duckett), **Ephemerum serratum* var. *minutissimum* (Jonathan Sleath), and *Riccia sorocarpa* and a little *R. glauca* (Fred Rumsey). The group then fanned out to attack the hill from all sides. The best find, by Jonathan Sleath, Chris Preston and others, was the rediscovery of *Grimmia laevigata* on the south-facing rocks, last seen in 1907. The low rock outcrop near the east end, explored by Gordon Rothero and Keith Watson, had abundant *Porella obtusata* and some *Pterogonium gracile*, while the rock terraces on the north side just below the summit had *Cynodontium bruntonii* and *Bartramia ithyphylla*. *Grimmia trichophylla* was abundant in several places.

In the late afternoon the minibus contingent was transported to Dunbar to catch the London train and thus ended a most enjoyable meeting.

I would like to record my thanks to the RBGE for hosting the meeting, and to Sally Rae, Liz Kungu, Daniela Schill and Gordon Rothero for assisting in running the meeting.

DAVID G. LONG

BRYOLOGICAL WORKSHOP 2002 (ARABLE BRYOPHYTES), PRESTON MONTFORD FIELD CENTRE

This workshop marked the beginning of the Society's Survey of Bryophytes of Arable Land (SBAL). On the first day there were lectures and practical sessions, and the SBAL recording pack was handed out. On the second day we tried out the methodology in the field. It was a pleasure to welcome three visitors from overseas: Irene Bisang and Niklas Lönnell from Sweden, and Herman Stieperaere from Belgium.

SATURDAY 16 NOVEMBER

Ron Porley set out the conservation background to SBAL. Cereal field margins are a priority habitat in the UK Biodiversity Action Plan. In spite of this, little is known about how arable bryophytes have responded to changes in farming practice. We need more information on the effects of organic farming, on the value of regularly leaving winter stubble, and on the types of flora that can be expected under crops other than cereals.

Irene Bisang introduced us to the biology of arable bryophyte diaspores. There are often large discrepancies between the diaspore bank and emerged plants on the surface. Pleurocarpous mosses are normally absent from the diaspore bank. Bryophyte spores and vegetative propagules are often long-lived; they can be incorporated into deeper soil layers, for example by earthworms. There is little inherent dormancy or seasonal variation (*Sphaerocarpos texanus* is an exception). Spores of Anthocerotaceae persist in the soil over long periods, mature plants being apparent only in years that have a favourable crop.

Mark Hill outlined the survey methodology and possible approaches to analysis. The SBAL methodology recognises three types of field: random (located in a randomly selected tetrad), ordinary and special. Analysis will seek to identify patterns of response to differing soils and climate, as well as the effects of farm management.

Chris Preston described how to use the recording card. The card is complicated, but rapidly becomes easier to fill in with practice. SBAL contributors are urged to persevere and not to panic. In particular, cover values and species frequencies estimated by eye do not have to be very accurate.

Finally, David Holyoak told us about *Bryum* in arable fields. He handed out draft keys to European species of *Bryum*. Several microspecies allied to *Bryum bicolor* do not appear to be distinct, being connected by obviously intermediate plants. British bryologists should keep an eye out for *B. demaretianum* and *B. valparaisense*.

SUNDAY 17 NOVEMBER

Ford (SJ407134, SBAL site code SJ41B1)

In calm dry weather the party of 28 bryologists made its way to an arable field at Ford, about 3 km from Preston Montford. First, we recorded at a station in the centre of the field. Then the party divided to record the four corners. The field was quite rich in bryophytes, with a total of 25 species, of which most were typical for wheat stubble on slightly acid loam, pH 6.6. *Bryum*

bicolor was abundant, and *B. rubens*, *B. violaceum*, *Dicranella staphylina*, *Ditrichum cylindricum* and *Tortula acaulon* were frequent. There were small quantities of *Ephemerum serratum* var. *minutissimum*, *Pleuridium acuminatum*, *Riccia glauca* and *R. sorocarpa*. The most notable finds were *Pohlia lescuriana* with abundant tubers, found by Jonathan Sleath, and three stems of *Gymnocolea inflata* with perianths, found by Audrey Locksley. The *Gymnocolea*, which was growing among *Bryum bicolor*, must surely have been an adventive. How it found its way to the field is a complete mystery, but its presence demonstrates the amazing dispersal ability of bryophytes.

Atcham (SJ537092, site code SJ50J1; SJ539092, site code SJ50J3)

The next site was a field, pH 7.4, near Atcham on the River Severn, in one of the 100 random tetrads to be visited by SBAL. Although randomly chosen, it proved to be remarkably interesting. *Tortula truncata* was abundant. *Barbula unguiculata*, *Bryum bicolor*, *B. violaceum*, *Pohlia melanodon* and *Tortula acaulon* were frequent. *Hennediella stanfordensis* was present. Mark Lawley found *Pohlia lescuriana* (with round tubers) and Chris Preston found *P. melanodon* (with moniliform tubers). The best find was *Didymodon tomaculosus**, new to Shropshire, detected first by David Holyoak and subsequently by Jonathan Sleath.

A nearby stubblefield, pH 6.9, bordering the Severn, was examined by Sam Bosanquet, who had noticed *H. stanfordensis* there. Many of the same species occurred, including *D. tomaculosus*, found by Ron Porley. *Bryum gemmiferum* was present, and *Lunularia cruciata* and *Marchantia polymorpha* were added to the list for the day. Sam again found *Pleuridium acuminatum*. We had lunch in the open air, listening to the swirling waters of the Severn as they flowed under the fine old bridge.

Lower Betton Farm (SJ523081, site code SJ50J2)

In the afternoon, the party visited a second randomly selected stubblefield, pH 6.9, on the other side of the same tetrad. No new species were added, but we recorded 21 species, including *Bryum gemmiferum*, *Ephemerum serratum* var. *minutissimum* and *Riccia glauca*. *Pohlia melanodon* from this field also had tubers. The weather remained excellent, and as the sun was setting the remnants of the party took tea with Will Prestwood, an ecologist who happens to live at Lower Betton Farm.

Overview

Taken together, the two random fields and that at Ford averaged 24.7 species per field. The average number of species for the mid-field positions was 17.0 and that for the corners or ends was 15.8. Recording of edge positions resembled that on a normal field visit, the high whole-field totals being the consequence of intensive recording by many bryologists. However, Sam Bosanquet's field by the River Severn was not searched more intensively than on a normal field visit, and produced 25 species. Proximity to the river clearly enhanced the species list.

The main purpose of the workshop was to familiarise the team with field procedures for SBAL. At the end of the second day, most of the party had gained confidence, not least because they had been asked to fill in one of the recording sheets. The attractive identification guide, produced by Ron Porley and Gill Stevens with help from Fred Rumsey and Jonathan

Sleath, was in hot demand and will be widely used during the survey. It was a pleasure to see such real enthusiasm for the project. SBAL has got off to an auspicious and enjoyable start.

MARK HILL

REPORTS OF LOCAL MEETINGS

SOUTHERN GROUP

Rockford Common (VC 11), 27 January 2002

Rockford Common comprises an area of heathland and bogs recently acquired by the National Trust, and adjoins the western edge of the Crown Lands of the New Forest. Katherine Hearn, who led the meeting, said little was known of the wildlife of the area.

Much of the Common consists of bracken and scattered birch of little bryological interest. The bogs, however, were found to be as rich in bryophytes as one expects in the New Forest. Ten species of *Sphagnum* were seen, including *S. magellanicum*. *Splachnum ampullaceum* was locally frequent at its (so far) most westerly site in the New Forest. The hepatics among the *Sphagnum* included *Cladopodiella fluitans* and *Kurzia pauciflora*. On drier ground and peaty banks were *Dicranum bonjeanii* and *Cladopodiella francisci*. After days of heavy rain, the water level in the main river (Dockens Water) was very high and prevented examination of the banks, and generally the ground was very saturated with much water in temporary pools. In spite of this, a good tally of over 70 species was recorded.

Malling Down Nature Reserve (VC 14), 17 February 2002

This Nature Reserve (near Lewes) belongs to the Sussex Wildlife Trust who have recently acquired an additional area of land. The meeting was led by Malcolm McFarlane and we were accompanied by the Reserve Manager, Peter Hodge, who was keen to have an up-to-date bryophyte list.

The habitats include chalk grassland and old pits with much bare chalk and blocks of chalk. Species seen included *Aloina aloides*, *Bryum pallens*, *Campylium stellatum* var. *protensum*, *Microbryum rectum*, *Weissia longifolia* var. *angustifolia* and *Leiocolea turbinata*. *Seligeria calycina* and *S. calcarea* were also found; the first is a UK Biodiversity Action Plan priority species because it is almost endemic to England, and is common on the chalk downs, but *S. calcarea* is much less common in south England. We finished the day with a training exercise for the arable field survey. After some searching, we found a stubble field near Halland with limited patches of mosses, most of which were *Bryum rubens*. There were also *B. violaceum* and *Ephemerum serratum* var. *minutissimum*.

Boundway Hill, New Forest (VC 11), 12 October 2002

This was another excellent meeting led by Neil Sanderson. Boundway Hill is at the southern boundary of the New Forest and comprises various habitats. In calcareous flushes we found

Aneura pinguis, *Drepanocladus cossonii*, *D. revolvens* and *Philonotis calcarea*, as well as *Scorpidium scorpioides*. Bare patches on more acid soils had *Archidium alternifolium* and *Bryum alpinum*. In the bogs, we saw *Calliergon stramineum* and *Sphagnum* species, including *S. magellanicum*. Riverine woodland adjoins Avon Water, and we recorded *Hookeria lucens* and *Lejeunea lamacerina* there. Perhaps the most interesting habitat was a carr of alder, birch and willow with a ground flora comprised mainly of *Sphagnum* species, including *S. teres*, and abundant fruiting *Leucobryum glaucum*. On drier heathland nearby was a small amount of *S. molle*, bringing the day's tally of *Sphagnum* species to 16.

ROD STERN

THE BORDER BRYOLOGISTS, 2002

Recording the discovery of species and recounting adventures of days in the field constitute the core of natural history's literature. Yet a very small minority of naturalists are control-freaks who deplore accounts of what has been found where, fearing loss of influence or income (or both) when their exclusive knowledge becomes public. They would, of course, lose credibility and risk ridicule by admitting as much, so offer alternative explanations for their qualms, citing crowds of visitors damaging habitats, and unscrupulous collectors endangering species. Well, let our proselytising custodians of botanical taste beware: in common with other reports of field meetings (not to mention the annual lists of vice-county records in the BBS's *Bulletin*), this article describes graphic scenes of a bryological nature, which some readers may find shocking.

After our first meeting of the year at Ludlow Museum, attending to troublesome microscopic techniques and recalcitrant gatherings, February found six folk negotiating a flooded Wye valley to reach the safety of higher ground on **Coppet Hill** (SO5818) near Goodrich Castle, just south of Ross-on-Wye in south Herefordshire. Torrential rain had fallen for several days, but the day of our excursion turned out dry (at least from above), and the mild sunny weather made for pleasant botanising. Coppet Hill offers an entertaining mixture of limestone and mildly basic Old Red Sandstone, and in the event we spent all day on the limestone of the hill's north-eastern flank, where mixed deciduous woodland remains continuously and sufficiently moist for *Cololejeunea minutissima* at its only known site in Herefordshire, and stones on the ground sprout *Tortula marginata* and *Didymodon tophaceus*. Old lime-workings and surrounding spoil always attract bryologists, and Coppet Hill's are home to numerous calcicoles, such as *Bryum caespitium* and *Campylophyllum calcareum* (unusually, in fruit). *Encalypta streptocarpa* and *Eucladium verticillatum* grew on mortared masonry, but candidates for *Gymnostomum viridulum* found here the previous summer turned out to be *Gyroweisia tenuis* after checking under the microscope. Well-drained calcareous soil on the nearby spoil-heaps gave us the nerved *Campyliadelphus chrysophyllus* (growing near to its nerveless cousin *Campylium stellatum* var. *protensum*), *Ditrichum gracile*, *Fissidens incurvus* and *Leiocolea turbinata*, but no sign did we see of the little annual Pottiaceae which can be a feature of ephemeral calcareous habitats in winter.

March saw a team of ten exploring **Hanter Hill** (SO2557) in east Radnorshire. As we approached the hill, an old mortared wall at Lower Hanter was growing *Aloina aloides*, *Pseudocrossidium revolutum* and an *Encalypta* which became the subject of an exchange of views about the differences between *E. vulgaris* and *E. ciliata*. Rocks on the sheepwalk behind the farm held a *Grimmia* which eventually answered to the name of *G. trichophylla*.

Racomitrium elongatum grew nearby, alongside seedlings of Upright Chickweed (*Moenchia erecta*) and Shepherd's Cress (*Teesdalia nudicaulis*). Hanter is one of a cluster of neighbouring hills (the others being Stanner, Old Radnor and Worsell) made of Precambrian volcanic rocks which offer very variable combinations of minerals to their plants, so a botanist may pass from acidic to basic floras in a matter of metres and minutes. Whereas conditions further up Hanter's slopes are invariably acidic, rocks and soil along the north-western foot of the hill sport numerous calcicoles as well: *Ctenidium molluscum*, *Fissidens dubius*, *Neckera complanata*, *Thuidium delicatulum*, *Tortula subulata*, *Trichostomum brachydontium* and *Lejeunea cavifolia*. Much of the ground, however, provided evidence of greater acidity: *Fissidens adianthoides*, *Hedwigia stellata*, *Bartramia pomiformis*, *Bryum alpinum*, *Racomitrium aciculare*, *R. aquaticum*, *Marsupella emarginata*, *Scapania compacta*, *S. gracilis* and *Tritomaria quinquedentata* were frequent on and about the boulders. Your correspondent regrets to inform that from time to time attention strayed to lichens, with a climax of cooing on arrival at a very dubious-looking substance which reportedly rejoices in the name of *Ephebe lanata*.

A few flushes below springs along the foot of the hill also contain a mixture of acid-lovers and basiphiles. *Campyllum stellatum* var. *stellatum* and *Drepanocladus cossonii* indicated the presence of bases, while away from the seepage-runs *Cephaloziella hampeana* showed its attractive crimson male shoots, and *Riccardia multifida* found a tiny patch of bare soil. *Bryum pallescens* was fruiting beneath a dripping drainage-pipe on a barn, and the trunk of an old ash tree grew *Leucodon sciuroides* and *Orthotrichum lyellii*.

As teatime approached, we moved along the road to **Stanner Rocks**, where Ray Woods demonstrated some of the rarities of this south-facing, often sun-baked, volcanic outcrop beloved by bryophytes with mainly Mediterranean distributions: *Bartramia stricta*, *Grimmia ovalis*, *G. longirostris*, *Riccia beyrichiana*, *R. nigrella*, *Targionia hypophylla* and *Reboulia hemisphaerica*.

On a bright sunny day in April larks sang in the heavens and curlews thrilled as we made sport at **Rhos Fiddle** (SO2085) in the Clun Forest in south-west Shropshire. This wet moorland with unimproved sheepwalks, peaty and boggy areas has recently become a nature reserve of the Shropshire Wildlife Trust, and boasts a representative, if apparently unremarkable, assemblage of bryophytes to be expected from such habitats. We put the JNCC field-guide to *Sphagnum* through its paces, finding and identifying *S. capillifolium*, *S. denticulatum*, *S. fallax*, *S. inundatum* and *S. palustre*. Of our other finds, *Polytrichum strictum* has seldom been recorded from Shropshire, and wetland pleurocarps included *Calliergon cordifolium*, *Warnstorfia exannulata* and *W. fluitans*. Of liverworts we found *Cephalozia bicuspidata*, *C. connivens* and *Barbilophozia barbata*, and Joy Ricketts showed us the attractive lichen *Cladonia arbuscula*. A Short-eared Owl rose like a ghost from the ground, and wafted silently over the moor, as if pulled on invisible strings.

Our May outing took place in similarly brilliant sunshine at **Darnford** and **Catbatch** (SO4297) on the Long Mynd in west Shropshire. No bryological surprises came our way in the course of the day, but a considerable number of species were in evidence. In the Darnford valley, outcrops of acidic rock gave us *Hedwigia ciliata* and *Racomitrium aquaticum* (the latter here towards the eastern edge of its range locally), and flushes held *Campyllum stellatum* var. *stellatum* and *Chiloscyphus pallescens*, with *C. polyanthos* for comparison in the stream. The flushes of Catbatch had *Calliergon cordifolium*, *C. stramineum*,

Drepanocladus revolvens and *Warnstorfia exannulata*, with *Cynodontium bruntonii* on rocks. As seems usual on the Long Mynd, the first rabbit burrow we examined was lined with *Schistostega pennata*.

After cavorting in Carmarthenshire on the BBS summer meeting, playtime in Perthshire arrived, as a scouting party headed north to reconnoitre and ransack the hills for Caledonian cryptogams in advance of next year's summer meeting. However, rain discouraged us from exploring high ground on our first day in Scotland, so we looked over shingle on the west bank of the River Tummel at **Tomdochoille** (NN9655), downstream from Pitlochry. *Pohlia drummondii* and *P. filum* found damp, nutrient-enriched soil between stones on the shingle banks to their liking, along with *Racomitrium canescens* and (rather surprisingly) *Bartramia ithyphylla*. A weird-looking *Bryum* with obtuse tips to the upper leaves, growing in soil between the pebbles of shingle, eventually turned out to be *B. pseudotriquetrum*. Beautiful *Ptilidium pulcherrimum* spread itself over an uprooted tree trunk which had been washed down by the river. *Scapania subalpina* and *Schistidium rivulare* grew nearby, and an oat-field near the lane contained *Bryum violaceum*.

The rest of our week was fortunately fine enough to explore higher ground, and rather than going over the region's well known hot-spots on higher peaks, we looked over bryologically little-known ground on the spurs of Ben Vrackie and around Spittal of Glenshee, in an effort to extend the sum of knowledge about the occurrence of species.

For our first day on **Ben Vrackie** (NN9461 - NN9563), we followed the well-known path from Moulin, paying our respects to Brown Bog-rush (*Schoenus ferrugineus*) on the way. Lesser Twayblade (*Listera cordata*) lurked beneath many of the heather clumps, and Scottish Asphodel (*Tofieldia pusilla*) was a feature of the calcareous flushes, but we were there to work, so averted our gaze. *Dicranum scottianum*, *Grimmia curvata*, *G. hartmanii* and *Barbilophozia hatcheri* bestrode boulders alongside the path, with *Ditrichum lineare*, *Marsipella funckii* and *Blasia pusilla* on compacted soil.

Upon reaching the main buttress, the flora was predominantly basiphilous; *Encalypta ciliata*, *E. rhaptocarpa*, *E. streptocarpa*, *Grimmia donniana*, *G. torquata* and *Scapania gymnostomophila* were found on rock or in crevices. A tiny tuft of a *Grimmia*-like substance growing on a boulder turned out after prolonged microscopic contemplation to be *G. incurva* - a pathetic imitation of the robust colonies which abound on Titterstone Clee in Shropshire.

On leaving the crags, the rare *Eurhynchium pulchellum* barred our way past a hummock of soil at its only known extant British station outside Skye. We continued north-east, crossing more acidic ground towards Ben Vrackie's eastern flank. *Cynodontium jenneri* fruited in a shaded crevice of rock, with *Grimmia curvata*, *Hymenostylium recurvirostrum*, *Kiaeria blyttii* and *Splachnum sphaericum* on boulders. We missed an area of wet rock further east along the spur, and instead headed up a gully over into the northern coire, where flushes contained *Scapania scandica* and fruiting *Meesia uliginosa*.

For our second day on Ben Vrackie, we explored the hill's western flank: **Meall an Daimh** and the crags immediately south thereof (NN9363). Leaving the path down to Killiecrankie, we crossed a mire which may well repay fuller inspection than the fleeting glance we gave it, and the first boulder we came to beneath the crags told us how exciting this base-rich ground might be, for within a short interval of time and space *Antitrichia curtipendula*, *Bartramia*

ithyphylla, *Bryoerythrophyllum ferruginascens*, *Ditrichum gracile*, *Grimmia curvata*, *G. hartmanii*, *G. torquata*, *Kiaeria blyttii* and *Schistidium strictum* had all presented themselves for inspection, and jostled for the privilege of leaping into packets. Liverworts represented themselves with *Frullania fragilifolia*, plentiful *Barbilophozia hatcheri* and much less *B. barbata*. Indeed, *B. hatcheri* seemed to be the commonest member of its genus on the ground we explored during the week.

Dauntingly precipitous crags above us deterred a frontal assault, so we took the wimps' way up, sidling round their eastern edge, a route which proved quite challenging enough from a bryological perspective, as *Splachnum ampullaceum* and *Syntrichia virescens* came before us. The *Syntrichia* was a surprise, growing on soil half way up a Scottish mountain, for the good books say it normally occurs as an epiphyte or on man-made substrates on low-lying ground. Bounding up the slopes, a boulder on the ridge gave up *Grimmia longirostris* and *Pterigynandrum filiforme*. On again to Meall an Daimh, where exposed, friable soil on its south-facing slope held *Didymodon ferrugineus*, *Entodon concinnus*, *Encalypta rhaptocarpa* and *Myurella julacea*, with *Dicranum fuscescens*, *D. scottianum*, *Distichium capillaceum*, *Ditrichum gracile*, *Orthothecium rufescens*, *O. intricatum*, *Pohlia cruda*, *Pseudoleskeella catenulata*, more *Pterigynandrum filiforme*, *Seligeria donniana* and *S. recurvata* on rocks. *Scapania gymnostomophila* held up the hepatic end of interest. Time passed unnoticed as we browsed among this bryological feast, and the afternoon was too far gone to explore crags on the hill's north side. Thirst things first, so we headed back to the bar at Moulin for market-research among a fine range of home-brewed beers.

The other district to occupy us during the week was Spittal of Glenshee, beginning with crags on the east side of Glen Taitneach. We wondered if they might be as bryologically rewarding as outcrops on the other side of the hill, west of the road up to The Cairnwell. In this hope we became disappointed, for the exposures we looked at in Glen Taitneach proved only slightly and patchily basic, and did not bear comparison with the rich ground on Ben Vrackie. Nevertheless, several species came to hand which we southerners seldom see. On or around the rocks of **Creag Dallaig** (NO0875) *Dicranoweisia crispula*, *Grimmia donniana*, *Kiaeria blyttii*, *Rhabdoweisia fugax* and *Barbilophozia hatcheri* occupied base-poor niches, cheek-by-jowl with the calcicoles *Distichium capillaceum*, *Drepanocladus cossonii*, *Grimmia torquata* and *Orthothecium intricatum*. Further down the valley, rocks in and by the stream draining **Coire Shith** (NO0972) held *Hygrohypnum eugyrium* and *Jungermannia hyalina*, with a calcareous boulder nearby sporting *Seligeria donniana* around more robust calcicoles such as *Tortella tortuosa* and *Schistidium* agg. South-facing crags at the foot of **Ben Gulabin** (NO0971), opposite Dalmunzie Hotel, gave us *Encalypta vulgaris*, *Grimmia donniana* and *Orthotrichum rupestre*, but by now we were hot, dry and dehydrated, so into the bar we went.

A couple of days later, ground across the glen in **Coire a'Gheàrrraig** (NO0769) on the north-east flank of Ben Earb proved considerably more basic - more a bryological peer to Ben Vrackie than the crags along Glen Taitneach. Following a stream up from the back of the Dalmunzie Hotel, rocks by the water had several calcicoles, including *Anoetangium aestivum*, *Grimmia torquata* and *Leiocolea bantriensis*, mixed amongst acidophiles. A Black Grouse whirled away up the glen as we skirted round a young, deer-fenced plantation of spruce. The crags beyond were all and more than we could have hoped for. Immediately we were finding *Antitrichia curtipendula*, *Distichium capillaceum*, *Grimmia curvata*, *G. donniana*, *G. hartmanii*, *Scapania aequiloba* and *S. scandica*. Contouring along, a further orgy of browsing over rocks and soil on the slopes left us gawping at *Amblyodon dealbatus*,

Meesia uliginosa, *Dicranum scottianum*, *Isopterygiopsis pulchella*, *Kiaeria blyttii*, *Orthothecium intricatum*, *O. rufescens*, *Plagiothecium denticulatum* var. *obtusifolium*, *Pterigynandrum filiforme*, *Schistidium strictum* and *S. trichodon*. Liverworts were less varied, as indeed they were all week, doubtless because we were so far from the western seaboard and hence in drier country. Nevertheless, we did see some hepatics, such as *Gymnomitrium concinnum*, *G. obtusum*, *Lophozia incisa* and *L. sudetica*, and *Leiocolea alpestris* grew on a stone in a flush near to the uncommon moss *Oncophorus wahlenbergii*. To round off the day, a patch of the strikingly symmetrical pale-green moss *Conostomum tetragonum* grew on rocks at the top of the coire.

We spent our last day on the hills of Perthshire searching cliffs on the east side of **Carn nan Sac** (NO1277 and NO1276), overlooking The Cairnwell. Calcareous ground above the ski-lift is a well-known *locus classicus* for botanists, and we spent little time there before passing on to the less familiar ground we had chosen to explore. *Herzogiella striatella* grew on a grassy slope below the ridge as we made our way over to Carn nan Sac. There the cliffs and scree below disappointed insofar as they proved not to be calcareous, but consolation came in good measure with the appearance of *Grimmia atrata*, *G. curvata*, *G. donniana* and *G. incurva* (this last-named being identical to the stunted stuff we had seen on Ben Vrackie). *Ditrichum zonatum* was there too, along with *Andreaea alpina*, *Kiaeria blyttii*, *Pohlia elongata* subsp. *elongata* and subsp. *polymorpha* and *Barbilophozia hatcheri*. Coming off the hill down a long south-facing spur to the road, we passed an outcrop of pinkish-looking rock, quite different to the forbidding dark stone of the cliffs above. Here, a boulder by our way held a range of common calcicoles and *Pseudoleskeella catenulata*, which convinced us that richer ground than we had been on that day lies closer to the road.

The art of field bryology is fine and often intricate, so clear-cut decisions about one's discoveries sometimes elude us. But the conclusion we drew from our Perthshire lists was obvious enough - that you would have to be several slates short of a full roof not to come on the BBS meeting there this coming summer.

Back on home territory, a stormy day in October saw six stalwarts abandoned by their fair-weather friends. Our target was the upper **Olchon Valley** (SO2733 - SO2634) hard by the Welsh border in south-west Herefordshire, where it soon became clear that base-rich ground alongside the stream bore comparison with similar habitat in Perthshire. Admittedly, many Scottish mosses were absent, but over 80 species went on the list in the course of half a mile's exploration, and more still would doubtless have joined them had the weather been kinder.

Jonathan Sleath pointed out the neat colonies of *Bryum radiculosum* and the profusely gemmiferous *B. subelegans* (or *B. laevifilum*, as we should now be calling it) on the mortared bridge by the lane, and *Gymnostomum aeruginosum* made its first appearance of the day on a damp retaining-wall below. Rocks in the stream were home to *Brachythecium plumosum*, *Hygrohypnum luridum* and *Schistidium rivulare*, and we came across *Hyocomium armoricum* further upstream. Less frequently inundated boulders hid beneath colonies of *Tortella tortuosa* and *Schistidium crassipilum*, and several flushes above the stream's banks were full of *Sanionia uncinata*, while another contained *Drepanocladus cossonii*. Patches of *Philonotis fontana* were compared with the larger, second shoots of *P. calcarea* nearby. Other calcicoles noted included *Ditrichum gracile*, *Seligeria recurvata* and *Tortula subulata*, and *Dicranella rufescens* grew in shallow soil on a boulder. Diminutive *Fissidens exilis* came to notice on the soil of the stream's bank, and the larger *F. adianthoides* occurred nearby. However, the rain

came down ever harder and faster, and with honour satisfied by early afternoon we beat a retreat to hot baths and toddies. The Olchon Valley will surely repay further and more thorough exploration in better weather.

Our final excursion of the year took place on and near **The Bloreng**, immediately south-west of Abergavenny in Monmouthshire, by kind invitation of Sam Bosanquet. During the morning we pottered about looking at common acidophiles on the moor, finding *Sphagnum papillosum*, *Cephalozia connivens* and *Calypogeia muelleriana* in wet runnels.

After lunch, we found conditions more sheltered and bryophytes more diverse at nearby **Garnddyrys** and **Cwm Ifor** (SO2511), a north-facing valley with an industrial past. Outcrops of Carboniferous Limestone, heaps of calcareous spoil-soil, furnace-slag and a stream provided a mosaic of habitats which entertained us all afternoon. A mound of spoil below our lunch-spot grew a range of calcicoles, including *Aloina aloides*, *Campyliadelphus chrysophyllus*, *Campylium stellatum* var. *protensum* and *Ditrichum gracile*, and Sam pointed out *Hypnum lindbergii* looking flatter and more hooked at the apices of its leaves than *H. lacunosum* nearby. *Bryum pallescens*, a species apparently addicted to high concentrations of metal, grew on the furnace-slag along with *Lophozia sudetica*, and *L. bicrenata* was nearby on acidic spoil.

Following the old tramway along the hillside, steep grassy slopes with patches of exposed soil and rock gave us *Leiocolea badensis*, *Scapania aspera* (antical lobes crossing the stems, and green gemmae) and less *S. nemorea* (brown gemmae). Several notable fungi attracted attention and comment: the Biodiversity Action Plan priority species *Microglossum olivaceum*, along with the orange fingers of *Cordyceps militaris* (a species which infects and grows in insects living in the soil), and several waxcaps (*Hygrocybe coccinea*, *H. conica* and *H. punicea*). A calcicolous lichen, *Solorina saccata*, grew in the crevices of a retaining wall, looking as though it had the plague, with its dark ulcers set deep in fresh green thalli of similar hue to the liverwort *Preissia quadrata* nearby. Lorna Fraser found *Tortella tortuosa* with capsules, and *Neckera crispa* was also in fruit near the stream. Sam relocated a colony of *Cololejeunea calcarea* on a damp rock by the stream, with some leaves of a *Seligeria* next to it. A puzzling *Hygrohypnum* (either *H. eugyrium* or *H. luridum*) grew nearby, and a brief sortie along the western flank of the valley provided more *Leiocolea badensis* (rather unusually with a few underleaves) on a damp rock by the path.

This last meeting on our programme came about in consequence of conversation during the BBS's summer meeting, and was arranged with the aim of bringing together bryologists from neighbouring counties who live within commuting distance. In this our meeting was most successful, attracting fourteen folk from eight counties, and encouraged the wish for further joint meetings in future. Our will to share meetings, expertise, and information also confirms the Welsh border as a region of renaissance, no longer a bryological backwater for naturalists fearful of 'web sites, motorways, 125 mph trains, the national grid and GPSs', who abhor and shun technological advances facilitating the discovery of species and public pooling of records, reeled by private demons along maternal cords into their land of lost content ... yea, even unto the Middle Ages.

MARK LAWLEY

FUTURE MEETINGS OF THE SOCIETY

Members are reminded to read the BBS Safety Code, which is published in *Bulletin* 43 and is available from local secretaries for inspection during BBS meetings. Please inform local secretaries well in advance if you intend to join a meeting, even if you are not staying at the headquarters accommodation.

SPRING FIELD MEETING 2003, South Norfolk / North Suffolk, 10-15 April

Local secretary: Richard Fisk, 1 Paradise Row, Ringsfield, Beccles, Suffolk, NR34 8LQ; tel: 01502 714968; e-mail: richardjfisk@onetel.net.uk.

The meeting will be based on the Half Moon Inn, Rushall, nr Diss, Norfolk (tel: 01379 740793). This was chosen because it provides easy access to a number of interesting sites in this part of East Anglia. The Half Moon is a very pleasant country inn in a very small village. There are 10 rooms, mostly modern chalet style to the rear, the others in the main building. Prices are currently from £25 per night B&B. The Half Moon has a flourishing restaurant trade so when booking it will be advisable to specify whether you wish to eat there in the evenings. This is absolutely essential for Saturday night when there are two sittings in the restaurant. The first sitting is at 6.00 p.m. which will be necessary for Council members. If you mention that you are with the BBS it will help in organising the restaurant.

Rushall (pronounced Rueshall) is just off the A140 Norwich-Ipswich main road, approximately 6 miles from Diss and 17 miles south of Norwich. Diss is on the Norwich-Liverpool Street main railway line and all trains (which are very frequent) stop there. If anyone is travelling by train, please let me know and I can pick you up.

The Council meeting on Saturday will be in the church hall in Dickleburgh 2 miles away, since no hotels in the area were prepared to provide a meeting room on a Saturday night.

Information on other places to stay can be found at www.south-norfolk.gov.uk, from the Tourist Information Centre, Mere St, Diss, IP22 3AG (tel: 01379 650523), or from the local secretary. A map of the area can be viewed by visiting www.multimap.com.

Would members who plan to attend the meeting please let me know, particularly if you are travelling by train and require a lift from Diss station. I will send out details of the programme when it is finalised early in 2003.

SUMMER FIELD MEETING 2003, FIRST WEEK (INCLUDING *SCHISTIDIUM* WORKSHOP), Kindrogan, Perthshire, 5-12 July

Local secretary: Martin Robinson, Dalreoch Farm, Enochdhu, Blairgowrie, PH10 7PF; tel/fax: 01250 881477; e-mail: mcr@dalreoch.fsnet.co.uk.

This year the summer field meeting will be attended by Hans Blom, who will run a workshop on the genus *Schistidium*. The workshop will occupy the first three days of the week (6-9 July inclusive). The remainder of the week will be spent exploring some of the exciting habitats close to Kindrogan Field Centre.

VC 89 (East Perthshire) is comparatively well-known bryologically but in such a rich area there is no such thing as saturation coverage. Most of the hills have been visited at some time or other but not comprehensively. The Blair Atholl Dalradian limestone is extensive and outcrops occur all over the place. Treasures still lay hidden and, whereas the week is not likely to yield a huge number of new vice-county records, it is virtually certain that there will be some of the highest quality. For example, *Eurhynchium pulchellum* turned up in 2002 on Ben Vrackie - a hill that one might have thought of as well-known! The visits during the week will concentrate on some of the more out-of-the way but still easily accessible places within easy reach of the Field Centre.

Ben Vrackie will be visited and species found should include *Scapania gymnostomophila*, *S. degenii*, *Eurhynchium pulchellum*, *Pseudoleskeella catenulata*, *Barbilophozia quadriloba*, *Meesia uliginosa*, *Calliergon trifarium*, *Cinclidium stygium*, *Oncophorus virens* and possibly *Stegonia latifolia*, besides billowing masses of *Antitrichia curtipendula*. The hill is famous also for certain rare vascular plants that will add spice to the day.

Another day will be spent around the little-known Ben Earb, where the crags and extensive flushes should yield an array of basicolous rarities including *Oncophorus wahlenbergii*. It is hoped to include a day at Fealar, the most remote estate in the area, containing the highest inhabited house in Scotland. This will be the longest journey of the week (an hour on an unsurfaced road) but it will be well worth the effort. Stock species in the limestone gorge there include *Catoscopium nigrum*, *Tomentypnum nitens*, *Seligeria pusilla* and *Tritomaria polita*, and there is always the chance of *Dicranella grevilleana*.

It is intended to visit a gorge woodland, possibly Craighall near Blairgowrie. The woodland surrounding the Centre itself is fascinating. *Buxbaumia viridis* is present in one site and may be in others.

Kindrogan is now being managed by the Field Studies Council. There is a fixed number of rooms available during the week we have booked, all of them doubles, and so it is hoped that people will be willing to share. A single room supplement can be paid if really necessary. It would help Kindrogan enormously if bookings could be made as soon as possible, and at least before the end of May. There are several B&Bs very nearby and two hotels in Kirkmichael. Bookings should be sent to Kindrogan Field Centre, Enochdhu, Blairgowrie, PH10 7PG (tel: 01250 881286).

SUMMER FIELD MEETING 2003, SECOND WEEK, Pitlochry, Perthshire, 12-19 July

Local secretary: Mark Lawley, 12A Castleview Terrace, Ludlow, SY8 2NG; tel: 01584 876564; e-mail: m.lawley@virgin.net.

The second week will be a more informal affair, with members based in the Pitlochry area. A variety of montane, woodland and riverside sites will be surveyed in VC 89.

ANNUAL GENERAL MEETING AND BRYOLOGICAL SYMPOSIUM 2003, Queen Mary, University of London, 5-7 September

Local secretary: Professor J.G. Duckett, School of Biological Sciences, Queen Mary, University of London, Mile End Rd, London, E1 4NS; e-mail: j.g.duckett@qmul.ac.uk.

The meeting will take place at Queen Mary, University of London on Saturday 6 September followed by a field excursion on Sunday 7 September.

Queen Mary is conveniently situated on the tube (Stepney Green and Mile End stations) around 30 minutes from most major London rail terminals and approximately 30 minutes from the M11. Free parking is available to participants. Accommodation will be in the Halls of Residence on site, which overlook the Grand Union Canal and the Millennium Dendroduct. The symposium, AGM and conversazione will take place in the School of Biological Sciences.

The costs (including VAT) for the weekend are as follows:

Bed and breakfast, standard bedroom (single with hand wash basin)	£33.10
Bed and breakfast, en-suite bedroom	£44.00
Lunch (Saturday)	£8.15
Dinner	£9.35
Packed lunch (Sunday)	£7.00
Registration fee (including tea, coffee and biscuits)	£10.00

Bookings should be made through Jeff Duckett by either post or e-mail.

SPRING FIELD MEETING 2004, Worcestershire, 1-7 April

Local secretary: Tessa Carrick, Nuthatch, Moors Farm, Lakeside Court, Upton Warren, Bromsgrove, B61 7EY; tel: 01527 873135; e-mail: tessa@carrickt.fsnet.co.uk.

Accommodation will be in the Malvern area. Details will be available by the 2003 spring meeting.

Worcestershire is an under-recorded county, with attractive scenery and a wide range of habitats. The programme is likely to include visits to the Malvern Hills, the Wyre Forest, Bredon Hill with its limestone outcrops, the Teme Valley with its associated dingle woodlands and tufa streams, and arable sites.

PROPOSED FIELD MEETING ON THE ISLAND OF RUM, Summer 2004

Rum is the largest of the Small Isles off the west coast of Scotland, south of the island of Skye, and making up, with Skye, VC 104. It is a National Nature Reserve with impressive mountains, the 'Rum Cuillins' up to 812 m, wild coast and complex geology. It is a stunning place. There is an impressive checklist of bryophytes produced by David Long containing some 426 taxa, but we have only limited knowledge of the frequency and distribution of these plants. The purpose of the meeting is, through determined(!) recording, to produce the bulk of the information that will go towards some kind of bryophyte flora for the island.

Scottish Natural Heritage is very keen that this project goes ahead and will provide free accommodation in Kinloch Castle for up to 10 bryologists, although I will be pleased to have many more. The meeting will last one week and will probably take place in early July. Though there are good tracks on the island and we may have some Land Rover support, the going is generally rough and there will be a lot of walking. It is proposed that some hardy

souls will spend some nights in bothies to enable recording in the most remote areas. Because of the limited accommodation (unless you fancy a tent), I need to have reasonably firm idea of numbers by the end of 2003, hence this early note.

To express preliminary interest, contact Gordon Rothero, Stronlonag, Glenmassan, Dunoon, Argyll PA23 8RA (tel: 01369 706281, or preferably e-mail: gprothero@aol.com).

LOCAL MEETINGS PROGRAMME, 2003

NORTH WEST NATURALISTS' UNION, BRYOPHYTE AND LICHEN SECTION

All field outings are on Saturdays, starting at 10.30 a.m. (except 17 May, 11.00 a.m.). Bring food and clothing adequate for rough country. Please check with leader or section secretary a day or so before the meeting, in case of changes or cancellation.

- 8 February: **Kersal Vale**. Meet at Radford St (SD825017). Leader: Audrey Locksley.
15 March: **Blackden Clough**. Park on south side of A57 at SK131895. Leader: Joan Egan.
5 April: **Pennington Flash** (lichen meeting). Meet in the car park at SD644985. Leader: Jonathan Guest.
26 April: **Lud's Church**. Meet in the car park just before (east of) youth hostel (SJ998662). Leader: Martha Newton.
17 May: **Witherslack**. At Witherslack Hall turn right and park on rough track at SD437859. Leader: Jim Adams. **Starting at 11.00 a.m.**
14 June: **Petty Pool**. Meet in the car park by graveyard at SJ629694. Leader: Mike Walton.
14 July: **Etheroe Country Park**. Meet in the car park at SJ966908. Leader: Tony Smith.
23 August: **Thornton Wood**. Meet in the lay-by at Raby Mere (SJ331813). Leader: Len Johnson.
27 September: **Worsaw Hill**. Meet in Downham car park at SD784442. Leader: Martha Newton.
11 October: **East Clifton Tip**. Meet on Frodsham side of swing bridge at SJ534788. Leader: Len Johnson.
1 November: **Ogden & Piethorne Reservoirs**. Meet at end of road at SD957123. Leaders: Alan & Norman Bamforth.
6 December: **Belmont**. Meet by Belmont Church at SD674159. Leader: John Lowell.

John Lowell (section secretary), 37 Henley Avenue, Cheadle Hulme, Cheshire, SK8 6DE; tel: 0161 485 6992; e-mail: lokr@beeb.net.

OTHER BRYOLOGICAL MEETINGS, 2003

- 14-16 March: INTRODUCTION TO MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Rhyd-y-creuau, The Drapers' Field Centre, Betws-y-coed, Conwy, LL24 0HB. Especially for beginners, but others welcome too. Details from the Centre Director, Mr J. Ellis.

- 9-11 May: *SPHAGNUM* WEEKEND. Tutor: Dr Martha Newton, Rhyd-y-creuau, The Drapers' Field Centre, Betws-y-coed, Conwy, LL24 0HB. A chance to learn how to recognise most of the British species in the field, and to study them alongside keys. Details from the Centre Director, Mr J. Ellis.
- 21-28 May: MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Orierton Field Centre, Pembroke, Pembrokeshire, SA71 5EZ. Offering individual guidance in identification and ecology at all levels. Details from the Centre Director, Ms C. Millican.
- 28 July - 1 August: MOSSES AND LIVERWORTS OF WETLAND HABITATS. Tutor: Dr Martha Newton, Malham Tarn Field Centre, Settle, North Yorkshire, BD24 9PU. An opportunity to examine many of the significant ecological indicator species of these valuable and intriguing habitats. Details from the Centre Director, Mr A. Pickles.
- 1-8 August: MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Preston Montford Field Centre, Montford Bridge, Shrewsbury, Shropshire, SY4 1DX. Offering individual guidance in identification and ecology at all levels. Details from the Centre Director, Ms S. Townsend.
- 16-23 August: MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Kindrogan Field Centre, Enochdhu, Blairgowrie, Perthshire, PH10 7PG. Offering individual guidance in identification and ecology at all levels. Details from the Secretary, Ms R. Bromley.
- 23-27 August: *SPHAGNUM* MOSSES. Tutor: Dr Martha Newton, Kindrogan Field Centre, Enochdhu, Blairgowrie, Perthshire, PH10 7PG. Three days to practise field identification of most species of this ecologically important genus. Details from the Secretary, Ms R. Bromley.
- 30 August - 6 September: MOSSES AND LIVERWORTS. Tutor: Dr Martha Newton, Blencathra Field Centre, Threlkeld, Keswick, Cumbria, CA12 4SG. Offering individual guidance in identification and ecology at all levels. Details from the Centre Director, Mr A. Simms.
- 6-12 September: UNDERSTANDING CONSERVATION THROUGH BRYOPHYTES. Tutor: Dr Martha Newton, Rhyd-y-creuau, The Drapers' Field Centre, Betws-y-coed, Conwy, LL24 0HB. For everyone with a professional or amateur interest in bryophytes and conservation. Details from the Centre Director, Mr J. Ellis.

SPECIAL GENERAL MEETING, 12 APRIL 2003

To comply with the requirements of the Charity Commission, a Special General Meeting of the Society will be held at the Church Rooms, Dickleburgh, nr Diss, Norfolk, at 7.45 p.m. on Saturday 12 April 2003 (during the spring field meeting) to approve *en bloc* the latest version of the Society's Rules (see pp 45-48 of this *Bulletin*) which incorporates all changes made at past AGMs up to, and including, that held in Edinburgh on 14 September 2002.

It is not intended that any amendments be made to the rules as printed, and the meeting, the agenda for which will consist of the single item, 'To approve the rules of the British Bryological Society as set out on pp 45-48 of *Bulletin* 80', should be of very short duration.

MIKE WALTON

COUNCIL NEWSLETTER NUMBER 19

Much of the work of Council over the last year will be included in the President's Report from Council which will be in the minutes of the 2002 AGM in the next *Bulletin*. As with recent newsletters, therefore, this one will only highlight particular issues.

The Society's committees and working groups

It is pleasing to report that more members are becoming involved in the work of Council and its committees for the first time but, if the Society is to continue to thrive over the medium- to long-term, it is important that even more members do so. If, therefore, you would like to participate, please contact the General Secretary. The last AGM approved a change to the rules so that, in future, Elected Members will serve three years instead of two. This change is intended to ensure that they have a greater opportunity to participate in the affairs of Council and, as a result, to make their time on Council more satisfying. Over the next four years a number of officers will reach the end of their maximum term of office, and it is to be hoped that they can be replaced by members who have served as Elected Members and have some experience of the way in which the Society is managed.

Publishing activities

The Publications Committee is actively considering ways in which the *Bulletin* can be improved so that it provides more benefit for members generally. If members have views on what they wish to be included in the *Bulletin*, will they please contact the Editor, Marcus Yeo (address inside front cover).

Financial matters

Council is very grateful to Dr David Rycroft for agreeing to accept nomination as Treasurer. David was duly elected at the last AGM. It is also pleasing to report that John Blackburn has made a good recovery from his recent illness.

An increasing number of awards have been made from the Bequest Fund but money is still available for awards for appropriate activities (see *Bulletins* 77: 27 and 79: 7 & 32).

The Society has been able to claim approximately £2,500 under the terms of the Gift Aid scheme which enables tax paid by UK members to be reclaimed against their subscriptions. Members who did not respond to the earlier mailing will by now have received a follow-up letter and form and are urged to return it to the Membership Secretary, Mark Pool, as soon as possible, if they have not already done so. The Inland Revenue has belatedly told the Society that it cannot reclaim tax under the Gift Aid Scheme in respect of those members who already reclaim the cost of their subscription against their income tax as an expense incurred in connection with their employment. **Members who responded to the first mailing and fall within this category are asked to let the General Secretary know** (see p. 44 of this *Bulletin*).

MIKE WALTON

BBS LIBRARY SALES AND SERVICE, 2003

FOR LOAN (UK Members only)

Members wishing to borrow books or papers are advised to consider whether a photocopy of the appropriate pages would suffice instead of the original in those cases where copyright has expired. Charge 10p per exposure. Limit 50.

- a) Approximately 250 bryological books and journals and several thousand offprints of individual papers. A catalogue of the books and journals is available, price £1.00.
- b) Transparency collection, list available (s.a.e.). 630 slides in the collection. Loan charge (to cover breakage of mounts) 50p plus return postage. Only 50 slides may be borrowed at a time to minimise loss or damage.
- c) Microscope stage-micrometer slide for calibration of eyepiece graticules. 10 µm divisions. Loan deposit £45.00.

FOR SALE

Bulletins and journals

British Bryological Society *Bulletins*: back numbers from no 23 @ £1.00 each.

Transactions of the British Bryological Society/Journal of Bryology:

Vol. 1: parts 1-4	£2.40 each; part 5 out of print
Vol. 2: parts 1-4	£3.00 each
Vol. 3: parts 1-5	£2.40 each; £12.00 per volume
Vol. 4: parts 1,3-5	£2.40 each; part 2 out of print
Vol. 5: parts 1,3	£3.00 each; parts 2 & 4 out of print
Vol. 6: parts 1-2	£6.00 each; £12.00 per volume - ends series of <i>Transactions</i>
Vol. 7: parts 1-4	£5.00 each; £20.00 per volume - renamed <i>Journal of Bryology</i>
Vol. 8: parts 2,3	£5.00 each; parts 1 & 4 out of print
Vol. 9: parts 1-3	£5.00 each; part 4 out of print
Vol. 10: parts 1,3,4	£8.00 each; part 2 out of print
Vol. 11: parts 1-3	£10.00 each; part 4 out of print
Vol. 12: parts 1-3	£11.50 each; part 4 out of print
Vol. 13: parts 1-4	£15.50 each; £62.00 per volume
Vol. 14: parts 2-4	£18.00 each; part 1 out of print
Vol. 15: parts 1-4	£22.50 each; £90.00 per volume
Vol. 16: parts 1-4	£29.75 each; £119.00 per volume
Vol. 17: parts 1-4	£39.50 each; £158.00 per volume
Vol. 18: parts 1-4	£42.25 each; £169.00 per volume
Vol. 19: parts 1-4	£47.25 each; £189.00 per volume
Vol. 20: parts 1-2	£49.50 each; £99.00 per volume (only 2 parts)

As from *J. Bryol.* Vol. 21 inclusive, back issues will only be available from our publisher, Maney Publishing, Hudson Road, Leeds, LS9 7DL, UK.

BBS Special Volumes

Volume 1. Longton RE, Perry AR. 1985. <i>Proceedings of Jubilee Meeting 1983</i> , 89 pp.	£6.00
Volume 2. Newton ME. 1989. <i>A practical guide to bryophyte chromosomes</i> , 19 pp.	£2.50
Volume 3. O'Shea BJ. 1989. <i>A guide to collecting bryophytes in the Tropics</i> , 28 pp.	£3.50
Volume 4. Edwards SR. 1992. <i>Mosses in English literature</i> , 44 pp.	£2.50
Volume 5. Edwards SR. 1999. <i>English names for British bryophytes</i> , 2 nd edition.	£3.50

Census Catalogues

Duncan JB. 1926. <i>Census catalogue of British mosses</i> , 2 nd edition.	20p
Sherrin WR. 1946. <i>Census catalogue of British Sphagna</i> .	20p
Warburg EF. 1963. <i>Census catalogue of British mosses</i> , 3 rd edition.	20p
Paton JA. 1966. <i>Census catalogue of British hepatics</i> , 4 th edition.	20p
Corley MFV, Hill MO. 1981. <i>Distribution of bryophytes in the British Isles: a census catalogue of their occurrence in vice-counties</i> .	out of print
Blockeel TL, Long DG. 1998. <i>A check-list and census catalogue of British and Irish bryophytes</i> .	£7.50

Other items

Adams KJ. <i>Microscope techniques for the bryologist. Part 1. A beginner's guide</i> .	£1.00
Evans DE, Perry AR. 1987. Moss Wall Chart.	£2.80
Grolle R, Long DG. 2000. <i>An annotated check-list of the Hepaticae and Anthocerotae of Europe and Macaronesia</i> .	£3.00
Newton ME <i>et al.</i> , eds. 1988. <i>Bryology: modern research and the ways forward</i> .	£5.50
Pearman MA. 1979. <i>A short German-English bryological glossary</i> .	50p
Perry AR. 1992. <i>Mosses and liverworts of woodland</i> , 41 pp.	£4.00
BBS tie, claret with single BBS logo	£4.95
Swift x20 handlens and case	£20.00
Patterson no 2 stainless steel forceps	£4.00
Idealtek no 3 stainless steel forceps	£7.25
BBS car stickers	£1.00 & SAE

PLEASE DO NOT SEND PAYMENT WITH ORDERS. Customers will be invoiced for the correct amount including postage and packing. A legibly printed address label would be appreciated. All the above are available from the BBS librarian:

Kenneth J. Adams, 63 Wroths Path, Baldwins Hill, Loughton, Essex, IG10 1SH, UK.

ELECTION OF OFFICERS AND ELECTED MEMBERS OF COUNCIL

The terms of seven Officers, the General Secretary, the Conservation Officer, the Librarian, the Meetings Secretary, the Membership Secretary, the Recorder for Hepatics, and the Recording Secretary, expire at the end of 2003. All of the present incumbents are eligible for re-election.

Following the resignation of Mr H.W. Matcham in 2002, the office of Vice-President is vacant and it is necessary to elect a replacement, who will take up the office immediately and who will become President on 1 January 2004. It is also necessary to elect a further member who will take up the office of Vice-President on 1 January 2004 and who will become President on 1 January 2006.

Two Elected Members of Council will retire at the end of 2003 and neither Mr J. Graham nor Mr J.B. Mott is eligible for re-election in this capacity until two years have elapsed. There is also a vacancy for a third Elected Member, following the resignation of Mr G. Smith in 2002. In accordance with the rules that were approved at the AGM in 2002, one of the three new Elected Members will be elected for a period of two years and the other two will be elected for a period of three years each.

Members are invited to submit nominations for Officers and Elected Members, sending them to the General Secretary of the BBS, Mr M.A. Walton, Ivy House, Wheelock Street, Middlewich, Cheshire, CW10 9AB, to arrive no later than **9 August 2003**. A nomination must not be made without the consent of the person whom it is wished to nominate. If elections are needed, they will be held at the AGM in London on 6 September 2003.

GIFT AID: PROFESSIONAL FEES

Having given an unqualified assurance that the Society could reclaim tax refunds on BBS subscriptions paid under the Gift Aid scheme, the Inland Revenue subsequently advised that it could not do so in the case of any members whose subscriptions are allowed as an expense in connection with their employment and who, as a result, already receive a tax refund for it.

Therefore, members who have 'signed up' to the Gift Aid scheme but whose subscription is allowed as a taxable expense are asked to let me know, by telephone, letter or e-mail (at mikea.walton@virgin.net) so that the Society does not also make a claim for them under the Gift Aid scheme. Because the mistake was made by the Inland Revenue, they have allowed the claims that have already been made to stand.

I apologise for any inconvenience that this may cause but it has arisen for reasons beyond the Society's control.

MIKE WALTON

THE BRITISH BRYOLOGICAL SOCIETY LIBRARY

Whilst considering which books from Mr A.C. Crundwell's library bequest to the Society should be incorporated into the BBS library, it has become apparent to Council that this is an appropriate moment to review the future of the library.

Council intends, therefore, to set up a working party to carry out a review. The working party will report back to Council who will then make appropriate recommendations to a future AGM.

Any member who has views on the matter which he/she would like the working party to take into account is asked to post them to the General Secretary (address inside front cover), or to send them by e-mail (mikea.walton@virgin.net), as soon as possible.

MIKE WALTON

RULES OF THE BRITISH BRYOLOGICAL SOCIETY

1. Name

The Society shall be called THE BRITISH BRYOLOGICAL SOCIETY.

2. Objects

- (a) To promote and advance all branches of bryology throughout the world and especially in relation to bryophytes of the British Isles.
- (b) To facilitate the exchange of information among bryologists by organising field meetings, conferences, lectures and exhibitions, publishing the results of bryological study and research, maintaining a library, and other appropriate means.
- (c) To promote in every way possible the conservation of bryophytes.

3. Membership

The Society shall consist of Honorary members, Ordinary members, Senior members, Junior members, Student members and Family members.

- (a) Honorary members shall be bryologists who have rendered outstanding service either to bryology or to the Society. They shall be nominated by the Council and elected at an Annual General Meeting. They shall pay no subscription but shall have the same privileges as Ordinary members.
- (b) Ordinary membership shall be open to any individual with an interest in bryology. Ordinary members shall be admitted on payment of their first annual subscription. They shall be entitled to vote at meetings and to receive the *Journal of Bryology* and the *Bulletin of the British Bryological Society*.
- (c) Senior members shall be Ordinary members who have been members of the Society for forty or more years and who opt to pay a reduced annual subscription. They shall enjoy the same privileges as Ordinary members.

- (d) Junior members shall be members under the age of 21. They shall pay a reduced annual subscription and enjoy the same privileges as Ordinary members.
- (e) Student members shall be members who are full-time students, irrespective of age. They shall pay a reduced annual subscription and enjoy the same privileges as Ordinary members.
- (f) Family members shall be members of the family of, and resident with, an Ordinary or Honorary member; they shall pay a nominal annual subscription and enjoy the same privileges as Ordinary members except that they shall not be entitled to receive the Society's publications.
- (g) Council may terminate the membership of any member whose activities are considered to bring the Society into disrepute or be prejudicial to its objects.

4. Subscriptions

- (a) The annual subscriptions shall be as determined from time to time at Annual or Special Meetings of the Society. Members shall be informed of any proposal to alter the annual subscriptions at least four weeks before the meeting, and any changes shall require the agreement of at least 60% of those voting.
- (b) The annual subscription is due in advance on January 1st in each year. Members who have not paid their subscription by June 30th shall not be entitled to receive the Society's publications until the subscription is paid. Any member whose subscription is more than one year in arrears shall be suspended unless the Council shall decide otherwise.

5. Management of the Society

- (a) The officers of the Society shall be President, Vice-President, General Secretary, Treasurer, Editor or Editors, Librarian and such others as the Society may appoint. The President and the Vice-President shall not be debarred from simultaneously holding one of the other offices of the Society, apart from those of General Secretary or Treasurer.
- (b) The management of the Society shall be in the hands of a Council which shall consist of the officers, six Elected Members, and the immediate Past-President who shall remain a member of the Council for two years after he ceases to hold office. The immediate Past-President may also hold one of the other offices of the Society, apart from those of General Secretary or Treasurer. The Council shall meet at least once each year but its business may also be conducted, at the discretion of the President, by correspondence. The Council shall have power to co-opt.
- (c) The officers shall be elected at an Annual General Meeting for a term of two years dating from January 1st following the meeting and be eligible for re-election, except that the Vice-President shall automatically succeed the President. Officers shall be eligible for election to another office immediately after retiring from an office but retiring officers shall not be eligible for election as Elected Members until after an interval of two years. Vacancies occurring among the officers shall be filled at the next Annual General Meeting for a two-year term. With the exception of the Curator and Librarian, officers of the BBS shall have a normal limit of tenure of 10 years. Officers

who have served for 10 years or more can be re-elected, but only if proposed from the Chair and seconded by the Vice-President or an ex-President. For the purposes of this resolution, officers already serving in 1989 shall be deemed to begin their period of office on 1 January 1990. Thus the rule will have no effect until the year 2000.

- (d) The six Elected Members shall ordinarily serve for three years, two being elected at each Annual General Meeting. Vacancies occurring among the Elected Members shall be filled at the next Annual General Meeting for the remainder of the unexpired term. Elected Members whose initial appointment was for, and who have served, the full term shall not be eligible for re-election in this capacity for three years after their term expires.
- (e) Any member of the Society may propose members for election as officers or Elected Members of Council. Such proposals shall be made to the General Secretary at least four weeks before the Annual General Meeting. The Council may also make nominations at any time before the Annual General Meeting.
- (f) An Executive Committee comprising the President, Vice-President, General Secretary and Treasurer shall have power to act on urgent matters arising between Council meetings. The Executive Committee shall report its actions to Council at the earliest opportunity.
- (g) The Council may appoint from their own body, with or without the addition of other members, such other committees as may be needed. The Council may also appoint assistants to any officer; such assistants shall be entitled to deputise for the respective officers at meetings.
- (h) All Council Members shall be Trustees of the Society within the meaning of the Charities Act 1993.

6. Financial Matters

Expenditure of £500 or more, other than that incurred in normal Society business, shall be considered by Council or an AGM only as an agenda item. Questions raised without prior circulation of details shall be referred back to either the Executive Committee or the next Council meeting.

7. Meetings

- (a) An Annual General Meeting and at least one field meeting shall be held each year. Other meetings may also be held at the discretion of the Council. The places and times of such meetings shall be decided, as far as possible, at the previous Annual General Meeting.
- (b) The President shall normally be chairman at all meetings of the Society or its Council. In his absence, meetings shall be chaired by the Vice-President, General Secretary or Treasurer in that order of precedence. The procedure and order of business shall be decided by the Chairman who shall have a casting vote.
- (c) Notice of Annual and Special General Meetings, and of Council Meetings, shall be sent to all members eligible to attend at least four weeks in advance. Ten eligible members shall constitute a quorum at General or Council meetings. A Special General Meeting may be called at any time at the discretion of Council, or at the written request of any 50 members.

8. Publications

- (a) The *Journal of Bryology* and the *Bulletin of the British Bryological Society* are the official organs of the Society and shall each be published at least once a year. They shall include the results of original research, reviews, information on the biology, systematics and distribution of bryophytes, an official record of the activities of the Society and such other matter as will, in the opinion of the Editor or Editors, promote the Society's objects. The Editors shall be responsible to Council. The publications shall be on sale to non-members, and to libraries and other institutions, at such prices as the Council shall determine.
- (b) The Society may publish such other publications as the Council may from time to time determine.

9. Alteration of Rules

- (a) Changes in these Rules may be made only at an Annual or Special General Meeting. No alterations, variations or additions shall be made to the Rules which will make the objects of the Society not exclusively charitable or the funds and assets of the Society applicable otherwise than for exclusively charitable purposes.
- (b) Proposals for changing the Rules must be submitted to the General Secretary in writing not less than eight weeks before the meeting. The General Secretary shall send to all members of the Society notice of such proposed changes at least four weeks before the meeting. Changes in the Rules require the agreement of at least 60% of those voting.

September 2002

BRYOPHYTE SURVEY OF YTHAN DUNES, SOUTH ABERDEENSHIRE

I would be grateful to anyone who would help with recording the bryophytes of the Ythan Dunes in South Aberdeenshire (VC 92). The dunes are on the south side of the River Ythan estuary and south of the township of Newburgh.

At the moment no date has been set for the survey, but it will be in the first half of 2003, probably in April or May. Two days should be sufficient to cover the site. Those who are not within striking distance will have to make their own accommodation arrangements. For more information please contact me at the address below.

Keith Raistrick, 1 Drewton Avenue, Cross Cop, Heysham, Lancs, LA3 1NU; tel: 01524 423325.

RECORDING MATTERS 23

Regional Recorders

There are three amendments to the list of Regional Recorders:

- 16:** Jan Hendey, 30 Willet Close, Petts Wood, Kent, BR5 1QH
23: Jacqueline Wright, 15 Blenheim Way, Horspath, Oxford, OX33 15B
48-52: Tim Blackstock, Countryside Council for Wales, Plas Penrhos, Ffordd Penrhos, Bangor, Gwynedd, LL57 2LQ.

Jan takes over from Roy Hurr (and has done so for a little while), so thanks to Roy who nevertheless continues with bryological activities in Kent. George Bloom has been acting as Recorder for Oxfordshire since the inception of the Recorder network, so special thanks to George who feels it is now time to pass his role onto someone a bit younger. Tim Blackstock takes over the north Wales vice-counties from Marcus Yeo.

In addition, Chris Preston has resigned as Regional Recorder for the Channel Islands.

Completed record cards have been trickling in to me over the past six months - please keep them coming. It is possible to send records electronically, and Chris Preston can give details of how to do this if you are interested.

Survey of Bryophytes of Arable Land (SBAL)

The workshop we held at Preston Montford on 16-17 November 2002 to launch this three-year project was a great success, and the participants went away enthused and geared-up to tackle arable fields in their own patch. Mark Hill has produced a more detailed report of the workshop (see pp 27-29 of this *Bulletin*), so I will only say that, as a result of our field visit on Sunday to some stubble fields just outside Shrewsbury, we found the BAP priority moss *Didymodon tomaculosus*, new to Shropshire. This just shows what is still awaiting discovery in arable fields - there is so much potential! I am indebted to Gill Stevens, Jonathan Sleath and Fred Rumsey, who all helped to produce a well-presented 'survey pack', including a pull-out identification guide, which is available from Gill (G.Stevens@nhm.ac.uk) to those interested in participating in the project.

Threatened Bryophyte Database

The Threatened Bryophyte Database is a significant new initiative which attempts to integrate BBS members into the UK Biodiversity Action Plan process as well as conservation work more generally. Full details are given in the article by Nick Hodgetts on pp 52-59 of this *Bulletin*.

Ron Porley, English Nature, Foxhold House, Crookham Common, Thatcham, RG19 8EL; e-mail: ron.porley@english-nature.org.uk.

UPDATE ON THE BBS TRAVELOGUE

More than 40 members have so far pledged contributions to the BBS travelogue (see *Bulletin* 79: 32), so this looks like becoming a really worthwhile project. Regions which have already been 'adopted' (either wholly or in part) by contributors appear in the list below.

England			Wales	Scotland	Northern Ireland
Cornwall	Hertfordshire	Shropshire	Monmouthshire	Selkirkshire	Tyrone
Devon	Berkshire	Cheshire	Carmarthenshire	Roxburgh	Armagh
Dorset	Buckinghamshire	Leicestershire	Aberystwyth	Lothians	Down
Isle of Wight	Oxfordshire	Lincolnshire	North Wales	Bute	Antrim
North	Norfolk	Derbyshire		Easternness	Londonderry
Hampshire	Cambridgeshire	Lancashire		Orkney	
South Downs	North Somerset	North-east		several	
Kent	Gloucestershire	Yorkshire		Highland	
Surrey	Worcestershire	Westmorland		hills	
Middlesex	Herefordshire	Cumberland			
Essex					

In addition, a few people who indicated that they intend to contribute have yet to confirm which areas they will write about. Authors who send in their contributions before the end of 2003 will receive a complementary printed copy of all contributions received by then. Please let me know if you would like to contribute but have not yet said so. I will gladly supply guidelines for preparing an account.

MARK LAWLEY

TROPICAL BRYOLOGY GROUP: PROGRESS IN 2002

Newsletter and membership

The 17th newsletter of the Tropical Bryology Group (TBG) was produced in August 2002, and is available on the BBS web site at <http://rbg-web2.rbge.org.uk/bbs/tbg.htm#tbgnews>. It was a collaborative effort between Brian O'Shea and Michelle Price detailing the activities of members, ideas for future expeditions, and the progress made on the various projects undertaken by the TBG. This year saw the addition of two new members to the TBG: Min S. Chuah-Petiot (Department of Botany, University of Nairobi, Kenya) and Neil Bell (Natural History Museum, London). Members of the BBS with an interest, or potential interest, in tropical bryophytes are encouraged to join the TBG (contact: Michelle.Price@cjb.ville-ge.ch).

Mosses and Liverworts of Uganda

This book, edited by Jeff Bates with assistance from Nick Hodgetts (hepatics) and Brian O'Shea (mosses), is now well underway and the taxonomic contributions are due to be

completed by April 2003. Due to delays in getting specimens to authors, this may now be a tight timetable, but progress reports from authors have been positive. Details of the project can be found on the TBG section of the BBS web site (<http://rbg-web2.rbge.org.uk/bbs/ugabook.htm>), and progress information will be updated as completed contributions are received.

E.W. Jones' Flora of West African hepatics

After the hard work of Martin Wigginton in revising and updating this work of Eustace Jones, good progress has been made on finalising the publication of the book. It is already around 500 pages before the addition of the introductory chapters. The book will be published by the National Botanical Garden, Meise, Belgium. The illustrations, being prepared by Omer Van der Kerkhove, an artist from the Botanical Gardens at Meise, are superb and make a good complement to the text. The completed work will be a great tribute to E.W. Jones and his contributions to the knowledge of the hepatics of Africa.

Guide to bryophytes of sub-Saharan Africa

Slow but steady progress has been made this year on the treatment of the moss and hepatic genera by the various contributing authors for this publication. A target of mid-2003 has been set to complete the rest of the genera. More details about the flora can be found on the Tropical Bryology Research web site (<http://oshea.demon.co.uk/tbr/gba.htm>), which shows the progress made on each family. The illustrations of the taxa are still lagging behind the progress made on the taxonomic work. Each genus is illustrated by simple drawings of key characters, so if anyone with some drawing skills is able to assist with this, we would like to hear from them (contact Brian O'Shea: brian@oshea.demon.co.uk).

Future Malawi expedition

Discussion at the TBG annual meeting this year focused on the development of a future research effort in Malawi with the collaboration of resident bryologist Zacharia Magombo. Zacharia is a member of the TBG and has recently completed his PhD at Missouri Botanical Garden. He is based at the National Herbarium and Botanical Gardens of Malawi, Zomba, and was a participant in our 1991 expedition. He is keen to develop bryological work in Malawi, and particularly welcomes international assistance, especially initially in field collecting efforts. The TBG's successful trip to Mt Mulanje in Malawi in 1991 (see the TBG web site for a report on this trip by Royce Longton) allowed TBG members to make a contribution towards the knowledge of the Malawi bryophyte flora by publishing, to date, thirteen papers. These papers are listed on the TBG website and further publications are still in preparation. The first expedition will form a good foundation for the development of a project proposal for future work in Malawi.

Publications of members in 2002: TBG projects

Wigginton MJ. 2002. Checklist and distribution of the liverworts and hornworts of sub-Saharan Africa, including the East African Islands (version 1, 2/02). *Tropical Bryology Research Reports* 3: 1-88.

TBG web site

In 2003 the TBG web site will be hosted by the Conservatoire et Jardin Botaniques, Geneva, so that it can be maintained by Michelle Price. Details of the new site will be announced in the TBG newsletter of 2003, but the link from and to the BBS TBG web site should remain as seamless as it is at present.

New co-ordinator and review of the objectives of TBG

Michelle Price has now taken over as co-ordinator of TBG. She chaired the annual meeting of the TBG in Edinburgh, and she plans to begin her term as co-ordinator with a review of the TBG's objectives, with the help of the previous co-ordinator Brian O'Shea. The results of the review will be drawn up and circulated amongst TBG members for discussion at the annual meeting of the TBG in September 2003.

Michelle Price, Conservatoire et Jardin Botaniques, Case Postale 60, CH-1292 Chambèsy-GE, Switzerland; e-mail: Michelle.Price@cjb.ville-ge.ch.

Brian O'Shea, 141 Fawnbrake Avenue, London SE24 0BG; e-mail: brian@oshea.demon.co.uk.

MBE FOR JEAN PATON

In the New Year honours list Jean Paton was awarded a MBE for services to biology and nature conservation. I am sure members of the BBS will agree that this is a well-deserved award in view of Jean's huge contribution to bryology over the last 50 years.

MARCUS YEO

THE THREATENED BRYOPHYTE DATABASE

Background

Following the appearance of the *Bryophyte Red Data Book* in 2001 (Church *et al.*, 2001), it became clear that conservation of threatened bryophytes would best be served by a more active system than could be achieved by a one-off book publication. This has been attempted for vascular plants through the Threatened Plant Database Project, a co-operative venture between the statutory nature conservation agencies, Plantlife and the Botanical Society of the British Isles. The idea was to create a 'live' database of records of threatened plants that could be kept up-to-date, that would contain information on the state of populations of threatened species, and that would service their conservation by informing initiatives such as the UK Biodiversity Action Plan (BAP). Much good work was done during the course of this project, and also many valuable lessons learned. It was considered that it was time to do something similar for bryophytes, and consequently a three-year contract has been set up with English Nature, Scottish Natural Heritage, the Countryside Council for Wales, the Joint Nature Conservation Committee, the Biological Records Centre (BRC) and Plantlife to work with the BBS to run a Threatened Bryophyte Database (TBDB).

Aims

It is intended to keep up-to-date, detailed records of target species, in order to track the condition of their populations, and so inform conservation action. The aims of the project are:

- to collate detailed records of target species (including population information) on a database;
- to incorporate records from recent and ongoing survey work (e.g. arable bryophytes project, Plantlife conservation and survey programmes);
- to feed information to UK BAP lead partners and conservation agencies;
- to inform conservation programmes;
- to provide information from conservation programmes to bryologists and receive their recommendations and other input;
- to co-ordinate a network of bryologists to cover the most threatened species ('Moss Minders') and other selected species (see below);
- to obtain information from bryophyte research affecting threatened species (taxonomic changes etc.) and get it into the conservation community quickly;
- to construct as comprehensive a bibliography as possible for each target species;
- to update the dot-distribution maps presented in the *Atlas of the bryophytes of Britain and Ireland* (Hill *et al.*, 1991, 1992, 1994); however, the TBDB project only covers England, Scotland and Wales (not Ireland).

The database will also be a useful resource for the production of bryophyte Floras and studies on population dynamics and ecology.

Species covered

The target species for the database are essentially all those species identified as being 'of conservation concern' (see Table 1). These include Red Data List species (i.e. *Critically Endangered* CR, *Endangered* EN, *Vulnerable* VU, *Extinct* EX), *Data Deficient* species (DD), species just missing out on Red List status (*Near Threatened* NT), and species listed in legislation (Schedule 8 of the Wildlife and Countryside Act (WCA), UK BAP priority species, Annex II of the EU Habitats Directive (HD) and Appendix I of the Bern Convention (BC)). The raw material for the TBDB is the database used to produce the *Red Data Book*.

Table 1. Species of conservation concern that will be covered by the TBDB project (abbreviations are explained in previous paragraph)

Species	Status	Protected?	Species	Status	Protected?
<i>Acaulon triquetrum</i>	EN	WCA, BAP	<i>Andreaea blyttii</i>	NT	
<i>Acrobolbus wilsonii</i>	NT	BAP	<i>Andreaea frigida</i>	VU	BAP
<i>Adelanthus</i>	VU	WCA, BAP	<i>Andreaea nivalis</i>	NT	
<i>lindenbergianus</i>			<i>Anomodon attenuatus</i>	EN	
<i>Amblystegium radicale</i>	CR		<i>Anomodon longifolius</i>	VU	WCA
<i>Anastrophyllum</i>	NT		<i>Aongstroemia longipes</i>	NT	
<i>joergensenii</i>			<i>Aplodon wormskioldii</i>	CR	
<i>Anastrophyllum saxicola</i>	NT		<i>Athalamia hyalina</i>	DD	
<i>Andreaea alpestris</i>	DD		<i>Atrichum angustatum</i>	EN	

Species	Status	Protected?	Species	Status	Protected?
<i>Barbilophozia kunzeana</i>	NT		<i>Chenia leptophylla</i>	not evaluated	
<i>Barbilophozia quadriloba</i>	NT		<i>Cinclidotus riparius</i>	VU	
<i>Bartramia stricta</i>	CR	WCA, BAP	<i>Cirriphyllum cirrosum</i>	NT	
<i>Blindia caespiticia</i>	EN		<i>Cryphaea lamyana</i>	VU	WCA, BAP
<i>Brachythecium appleyardiae</i>	NT	BAP	<i>Ctenidium procerrimum</i>	VU	
<i>Brachythecium erythrorrhizon</i>	DD		<i>Cyclodictyon laetevirens</i>	EN	WCA
<i>Brachythecium starkei</i>	VU		<i>Cynodontium fallax</i>	EX	
<i>Brachythecium trachypodium</i>	CR		<i>Cynodontium polycarpon</i>	DD	
<i>Bryoerythrophyllum caledonicum</i>	NT	BAP	<i>Cynodontium strumiferum</i>	NT	
<i>Bryum archangelicum</i>	DD		<i>Cynodontium tenellum</i>	NT	
<i>Bryum arcticum</i>	DD		<i>Daltonia splachnoides</i>	VU	
<i>Bryum calophyllum</i>	VU		<i>Dichodontium flavescens</i>	DD	
<i>Bryum cyclophyllum</i>	EN		<i>Dicranella grevilleana</i>	NT	
<i>Bryum dixonii</i>	NT		<i>Dicranum bergeri</i>	VU	
<i>Bryum gemmilucens</i>	DD		<i>Dicranum elongatum</i>	CR	
<i>Bryum gemmiparum</i>	EN		<i>Dicranum leioneuron</i>	VU	
<i>Bryum knowltonii</i>	VU		<i>Dicranum spurium</i>	VU	
<i>Bryum lawersianum</i>	EX		<i>Dicranum subporodictyon</i>	NT	
<i>Bryum mamillatum</i>	CR	WCA, BAP	<i>Didymodon cordatus</i>	VU	WCA
<i>Bryum marratii</i>	EN		<i>Didymodon glaucus</i>	CR	WCA, BAP
<i>Bryum muehlenbeckii</i>	NT		<i>Didymodon icmadophilus</i>	NT	
<i>Bryum neodamense</i>	EN	WCA, BAP	<i>Didymodon mamillosus</i>	CR	BAP
<i>Bryum salinum</i>	VU		<i>Didymodon tomaculosus</i>	NT	BAP
<i>Bryum schleicheri</i> var. <i>latifolium</i>	CR	WCA	<i>Ditrichum cornubicum</i>	EN	WCA, BAP
<i>Bryum stirtonii</i>	VU		<i>Ditrichum flexicaule</i>	DD	
<i>Bryum subelegans</i>	DD		<i>Ditrichum plumbicola</i>	NT	BAP
<i>Bryum turbinatum</i>	EX		<i>Ditrichum subulatum</i>	NT	
<i>Bryum uliginosum</i>	CR		<i>Dumortiera hirsuta</i>	VU	
<i>Bryum warneum</i>	VU	BAP	<i>Encalypta brevicollis</i>	EX	
<i>Buxbaumia viridis</i>	EN	WCA, BAP, HD, BC	<i>Ephemerum cohaerens</i>	CR	
<i>Campylophyllum halleri</i>	EN		<i>Ephemerum sessile</i>	NT	
<i>Cephalozia ambigua</i>	DD		<i>Ephemerum stellatum</i>	EN	BAP
<i>Cephaloziella baumgartneri</i>	EN		<i>Eurhynchium meridionale</i>	VU	
<i>Cephaloziella calyculata</i>	VU		<i>Eurhynchium pulchellum</i>	EN	
<i>Cephaloziella dentata</i>	CR		<i>Fissidens curvatus</i>	NT	
<i>Cephaloziella integerrima</i>	VU		<i>Fissidens exiguus</i>	NT	BAP
<i>Cephaloziella massalongi</i>	VU		<i>Fissidens monguillonii</i>	NT	
<i>Cephaloziella nicholsonii</i>	VU	BAP	<i>Fissidens serrulatus</i>	VU	
<i>Cephaloziella turneri</i>	NT		<i>Fossombronia crozalsii</i>	EX	
<i>Ceratodon conicus</i>	EN		<i>Fossombronia fimbriata</i>	NT	
<i>Cheilothela chloropus</i>	NT		<i>Fossombronia maritima</i>	NT	
			<i>Funaria pulchella</i>	NT	
			<i>Geocalyx graveolens</i>	VU	WCA
			<i>Gongylanthus ericetorum</i>	NT	
			<i>Grimmia alpestris</i>	DD	

Species	Status	Protected?	Species	Status	Protected?
<i>Grimmia anodon</i>	EX		<i>Marsupella profunda</i>	VU	WCA, BAP, HD, BC
<i>Grimmia arenaria</i>	NT		<i>Marsupella sparsifolia</i>	VU	
<i>Grimmia crinita</i>	DD		<i>Micromitrium tenerum</i>	CR	WCA
<i>Grimmia elatior</i>	EX		<i>Mielichhoferia elongata</i>	VU	
<i>Grimmia elongata</i>	NT		<i>Mielichhoferia</i>	VU	WCA
<i>Grimmia ovalis</i>	VU		<i>mielichhoferiana</i>		
<i>Grimmia tergestina</i>	VU		<i>Mnium ambiguum</i>	NT	
<i>Grimmia ungeri</i>	VU		<i>Mnium spinosum</i>	NT	
<i>Grimmia unicolor</i>	VU	WCA	<i>Myrinia pulvinata</i>	NT	
<i>Gymmocola acutiloba</i>	VU		<i>Myurella tenerima</i>	EN	
<i>Gymnomitrium</i>	VU	WCA	<i>Nardia insecta</i>	DD	
<i>apiculatum</i>			<i>Neckera pennata</i>	EX	
<i>Gymnomitrium</i>	NT		<i>Odontoschisma</i>	NT	
<i>corallioides</i>			<i>macounii</i>		
<i>Gyroweisia reflexa</i>	EX		<i>Oncophorus</i>	NT	
<i>Habrodon perpusillus</i>	EN		<i>wahlenbergii</i>		
<i>Hamatocaulis vernicosus</i>	NS	WCA, BAP, HD, BC	<i>Orthodontium gracile</i>	VU	BAP
<i>Hedwigia ciliata</i>	DD		<i>Orthotrichum consimile</i>	DD	
<i>Helodium blandowii</i>	EX		<i>Orthotrichum</i>	EX	
<i>Herbertus borealis</i>	VU	BAP	<i>gymnostomum</i>		
<i>Heterocladium</i>	VU		<i>Orthotrichum</i>	EN	WCA, BAP
<i>dimorphum</i>			<i>obtusifolium</i>		
<i>Homomallium</i>	CR		<i>Orthotrichum pallens</i>	EN	BAP
<i>incurvatum</i>			<i>Orthotrichum pumilum</i>	CR	
<i>Hygrohypnum molle</i>	VU		<i>Orthotrichum speciosum</i>	NT	
<i>Hygrohypnum polare</i>	EN	WCA	<i>Pallavicinia lyellii</i>	VU	BAP
<i>Hygrohypnum smithii</i>	NT		<i>Paludella squarrosa</i>	EX	
<i>Hygrohypnum styriacum</i>	CR		<i>Palustriella decipiens</i>	NT	
<i>Hymenostylium insigne</i>	NT		<i>Paraleucobryum</i>	VU	
<i>Hypnum revolutum</i>	EN		<i>longifolium</i>		
<i>Hypnum vaucheri</i>	VU	WCA	<i>Petalophyllum ralfsii</i>	NS	WCA, BAP, HD, BC
<i>Jamesoniella undulifolia</i>	EN	WCA, BAP	<i>Phaeoceros carolinianus</i>	EN	
<i>Jungermannia caespiticia</i>	NT		<i>Philonotis cernua</i>	CR	
<i>Jungermannia leiantha</i>	CR		<i>Philonotis marchica</i>	EN	
<i>Jungermannia polaris</i>	NT		<i>Physcomitrium</i>	EN	
<i>Leiocolea fitzgeraldiae</i>	NT		<i>eurystomum</i>		
<i>Leiocolea gillmanii</i>	NT		<i>Physcomitrium</i>	NT	
<i>Leiocolea rutheana</i>	EN	WCA, BAP	<i>sphaericum</i>		
<i>Lejeunea holtii</i>	VU		<i>Pictus scoticus</i>	DD	
<i>Lejeunea mandonii</i>	EN	BAP	<i>Plagiobryum demissum</i>	EN	
<i>Leptodontium</i>	VU	BAP	<i>Plagiochila norvegica</i>	DD	
<i>gemmascens</i>			<i>Plagiomnium medium</i>	NT	
<i>Lescuraea saxicola</i>	EX		<i>Plagiothecium piliferum</i>	CR	WCA
<i>Lophozia capitata</i>	VU		<i>Pohlia andalusica</i>	NT	
<i>Lophozia longiflora</i>	DD		<i>Pohlia crudoides</i>	VU	
<i>Lophozia perssonii</i>	NT		<i>Pohlia obtusifolia</i>	EN	
<i>Lophozia wenzelii</i>	NT		<i>Pohlia scotica</i>	NT	BAP
<i>Marsupella arctica</i>	VU		<i>Pseudoleskea incurvata</i>	NT	
<i>Marsupella boeckii</i>	NT		<i>Pseudoleskeella nervosa</i>	VU	
<i>Marsupella condensata</i>	NT				

Species	Status	Protected?	Species	Status	Protected?
<i>Pseudoleskeella rupestris</i>	NT		<i>Sphaerocarpos texanus</i>	VU	
<i>Pterygoneurum lamellatum</i>	EX		<i>Sphagnum balticum</i>	EN	WCA, BAP
<i>Ptychodium plicatum</i>	NT		<i>Sphagnum lindbergii</i>	NT	
<i>Racomitrium himalayanum</i>	DD		<i>Sphagnum majus</i>	VU	
<i>Racomitrium macounii</i> subsp. <i>alpinum</i>	NT		<i>Sphagnum obtusum</i>	EX	
<i>Radula carringtonii</i>	VU		<i>Sphagnum skyense</i>	DD	
<i>Radula voluta</i>	NT		<i>Splachnum vasculosum</i>	NT	
<i>Rhynchostegium rotundifolium</i>	CR	WCA, BAP	<i>Stegonia latifolia</i>	NT	
<i>Rhytidiadelphus subpinnatus</i>	EN		<i>Syntrichia norvegica</i>	VU	
<i>Riccia bifurca</i>	VU	WCA	<i>Tayloria lingulata</i>	EN	
<i>Riccia canaliculata</i>	VU		<i>Tayloria tenuis</i>	CR	
<i>Riccia crystallina</i>	NT		<i>Telaranea nematodes</i>	VU	
<i>Riccia huebeneriana</i>	VU	BAP	<i>Tetradontium repandum</i>	CR	
<i>Riccia nigrella</i>	VU		<i>Thamnobryum angustifolium</i>	CR	WCA, BAP
<i>Saelania glaucescens</i>	VU	WCA	<i>Thamnobryum cataractarum</i>	VU	BAP
<i>Sanionia orthothecioides</i>	NT		<i>Timmia austriaca</i>	EN	
<i>Scapania gymnostomophila</i>	NT		<i>Timmia megapolitana</i>	DD	
<i>Scapania paludicola</i>	NT		<i>Timmia norvegica</i>	NT	
<i>Scapania parvifolia</i>	DD		<i>Tortella fragilis</i>	NT	
<i>Scapania praetervisa</i>	VU		<i>Tortella limosella</i>	EX	
<i>Schistidium agassizii</i>	NT		<i>Tortula cernua</i>	EN	WCA, BAP
<i>Scorpidium turgescens</i>	VU	WCA	<i>Tortula cuneifolia</i>	VU	
<i>Seligeria brevifolia</i>	VU		<i>Tortula freibergii</i>	NT	BAP
<i>Seligeria campylopoda</i>	DD		<i>Tortula leucostoma</i>	VU	
<i>Seligeria carniolica</i>	CR	BAP	<i>Tortula solmsii</i>	NT	
<i>Seligeria diversifolia</i>	DD		<i>Tortula vahlana</i>	NT	
<i>Sematophyllum demissum</i>	EN	BAP	<i>Tortula wilsonii</i>	EN	
<i>Sematophyllum substrumulosum</i>	DD		<i>Trematodon ambiguus</i>	EX	
<i>Southbya nigrella</i>	VU	WCA	<i>Weissia condensa</i>	VU	
<i>Southbya tophacea</i>	NT		<i>Weissia levieri</i>	EN	
			<i>Weissia mittenii</i>	EX	
			<i>Weissia multicapsularis</i>	EN	BAP
			<i>Weissia rostellata</i>	NT	BAP
			<i>Weissia squarrosa</i>	EN	
			<i>Weissia sterilis</i>	NT	
			<i>Zygodon forsteri</i>	EN	WCA, BAP
			<i>Zygodon gracilis</i>	EN	WCA, BAP

This list is not immutable, and will be reviewed regularly. It may be expanded at some stage to include other species for which Britain has an international responsibility, such as endemics and Atlantic species. The most important of the target species, purely from the point of view of current conservation practice, are the BAP priority species, as the government is signed up to meet certain targets for their conservation. Thus, a great deal of effort is going into recording populations of these species, and recommending and implementing management prescriptions to ensure their survival and (where appropriate) recovery. The TBDB can service these targets.

In addition, a small selection of *Nationally Scarce* (NS) and declining species have been chosen for special treatment, in order to clarify their status. These are listed in Table 2. We

need information on the current status of these species. Most of them were selected because of the large number of pre-1950 and undated records in the distribution maps in the *Atlas*. The populations represented by these records (and more recent records too) need to be investigated to see if the apparent decline is real or not. Are they going to be on tomorrow's Red List, or are they just under-recorded? Are there further populations that have not found their way into the *Atlas*? To begin with, we have picked a small number of species from this second list to act as a pilot, to see if we can use the TBDB project to get a handle on them. These are:

Throughout Great Britain:

Oedipodium griffithianum
Rhytidium rugosum
Thuidium abietinum (both sub-species)

South-east England and the Midlands only: *Climacium dendroides*
Plagiomnium cuspidatum
Rhodobryum roseum

Table 2. Nationally scarce species that will be covered by the TBDB project

<i>Amblystegium confervoides</i> <i>Brachythecium salebrosum</i> <i>Bryum canariense</i> <i>Bryum creberrimum</i> <i>Bryum mildeanum</i> <i>Bryum torquescens</i> <i>Buxbaumia aphylla</i> <i>Climacium dendroides</i> (south-east England and the Midlands only) <i>Cynodontium bruntonii</i> (outside Wales) <i>Eurhynchium schleicheri</i> (outside south-east England) <i>Grimmia longirostris</i> <i>Grimmia decipiens</i>	<i>Grimmia laevigata</i> <i>Grimmia orbicularis</i> <i>Isoetecium alopecuroides</i> (Midlands only) <i>Octodiceras fontanum</i> <i>Oedipodium griffithianum</i> <i>Plagiomnium cuspidatum</i> (south-east England and the Midlands only) <i>Pogonatum nanum</i> <i>Pterygoneurum ovatum</i> <i>Reboulia hemisphaerica</i> <i>Rhodobryum roseum</i> (south-east England and the Midlands only) <i>Rhytidium rugosum</i>	<i>Scleropodium cespitans</i> (northern England and southern Scotland only) <i>Scleropodium tourettii</i> (non-coastal sites only) <i>Sphaerocarpos michelii</i> <i>Syntrichia princeps</i> <i>Targionia hypophylla</i> <i>Thuidium abietinum</i> <i>Tomentypnum nitens</i> <i>Tortula protobryoides</i> <i>Ulota coarctata</i>
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How can BBS members contribute to the TBDB project and benefit from it?

There are three main ways in which BBS members can engage with the TBDB project:

1. **'Moss Minders'**. English Nature and the Natural History Museum have come up with the idea of 'Moss Minders', similar to Plantlife's Flora Guardians. A Moss Minder would keep an eye on a particular site, or series of sites, for a rare species or group of rare species, regularly monitor the population(s), and alert conservation bodies if they came under threat. BBS members are hereby invited to take on a species, or a site, to 'mind'. Guidance notes on the Moss Minder scheme will be produced as soon as possible. **If you would like to be a Moss Minder, contact me and I will send you whatever information is currently on the database.** In many - most! - cases, available information is inadequate, and there is plenty of scope for original and imaginative work on virtually all the species listed, although most BAP priority species are well covered at the moment.

2. **Record exchange.** The database is designed to be 'owned' by the Society, and so all the records (with the exception of a few highly sensitive species) are available for the use of members, whether for conservation purposes, Flora writing or other *bona fide* uses. Ultimately they will be available electronically through BRC via the National Biodiversity Network Gateway, but meanwhile I can answer all reasonable requests.

To achieve an up-to-date and active database, *your* records are needed for all the species listed in Tables 1 and 2 above. It is important to note that records for the TBDB require a higher level of data than records of common species or records that are just to be used for mapping purposes. The minimum data requirements for each record are:

- Species name
- Locality
- Vice-county
- Grid reference (if possible to 10 figures, determined with a GPS, e.g. AB12345678)
- Date
- Recorder (and determiner, if different)
- Number and location of specimen (if any)
- Habitat, substrate, associates
- Abundance - notes on population, e.g. a count of the number of shoots, extent of colony, or whatever is appropriate for the species
- Observations on health of population and any threats

In addition it would be extremely useful to provide sketch maps and even digital photographs to show the location of populations. If you can send records electronically, that is preferred. Otherwise I am perfectly happy to cope with written records posted to me. All contributors will in return receive regular reports and updates on species in their area of interest (whether geographical or taxonomic).

3. **Taking part in a survey of the six 'pilot' species listed above.** If there are records of any of these nationally scarce or declining species in your area, follow them up, and see if they are still there. If you have new information on any of them, send it in. The data requirements for these are the same as for the other species.

Please help make this project a success by contributing to it in any way you can. Your records can directly help the conservation of the plants we hold dear! Meanwhile I will be contacting county recorders directly, and trawling through other databases, reports, Floras and herbaria to attempt to keep the database as up-to-date as possible.

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RECENT DEATHS

It is with regret that we announce the death of Dr E. Nyholm, the distinguished Swedish bryologist and honorary member of the Society who will be particularly remembered for her publications *The Illustrated Moss Flora of Fennoscandia* and its revised edition, *The Illustrated Flora of Nordic Mosses*, and for her work in collaboration with the late Alan Crundwell.

ACAULON MUTICUM VAR. MEDITERRANEUM IN BRITAIN

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Taxonomy

Acaulon mediterraneum was described by Limpricht (1890) from Sardinia. He indicated that it was a smaller plant than *A. muticum*, with entire perichaetial bracts and spiculose rather than finely granulose spores. Sérgio (1972) examined five gatherings of *Acaulon* from Portugal, all of which differed from material from northern Europe in having spiculose spores. Since the Portuguese specimens showed great variability in leaf characters and spore size, they were regarded as conspecific with *A. muticum* and on that basis the new combination *A. muticum* var. *mediterraneum* (Limpr.) C. Sérgio was named.

Hill (1982) reassessed British material attributed to *A. minus* (Hook. & Taylor) A. Jaeger. He demonstrated that the characters used to separate it from *A. muticum* are inconstant and poorly correlated with each other, so that it should be regarded as a synonym. He also commented on *A. mediterraneum*, on the basis of two specimens from south-west England which had 'spiny' spores, but which did not differ consistently from *A. muticum* in leaf characters or spore size. One specimen with apparently intermediate spore ornamentation is mentioned (above Stanbury Mouth, north of Bude, East Cornwall, SS2013, 28 March 1963, J.A. Paton 791, now at E), but my re-examination of this gathering in 1998 revealed only the granulose spores typical of *A. muticum* along with smoother immature spores. Indeed, no evidence of intermediate spore ornamentation was seen from this or any other specimen examined in the present study. Hence, while Hill's conclusion (*op. cit.*, p. 12) that 'there is apparently little correlation between spore ornamentation and vegetative characters' is correct, dismissing *A. mediterraneum* as 'not worth varietal status' on the basis also of the occurrence of intermediate spores seems less convincing.

Other authors have tended to regard *A. mediterraneum* as a valid species. Stone (1988) revised Australian material of the '*Acaulon muticum* complex', using the scanning electron microscope (SEM) to study whole spores and the transmission electron microscope (TEM) to study sections of spores, in addition to making detailed measurements and analyses of characters of the sporophyte and gametophyte visible with the light microscope. It was revealed (*op. cit.*, p. 263) that 'The spore coat appears to be the most useful diagnostic feature in the *A. muticum* group. It seems impossible to separate with certainty any of the species of the group (except *A. eremicola* and *A. granulosum*) by any character other than the pattern of the sporoderm of mature spores, a feature which can be determined with the light microscope'. SEM and TEM micrographs of spores of the four Australian species (including *A. mediterraneum*) and of *A. muticum* from England revealed that each of them showed consistent 'species-specific' characteristics. *A. muticum* was found to have a finely textured granular surface on the subtectate spores, with a variable amount of loosely adhering agglomerations of perinous material over the surface. *A. mediterraneum* 'has a distinctly different spore coat, characterized by long spines and no loose perinous material'. It is concluded (*op. cit.*, p. 265) that 'While recognising the close affinity of the suite of species in the *Acaulon muticum* complex the taxonomic situation of which to date has been rather ambivalent, I find it less cumbersome to keep the various taxa at the species level rather than introduce intraspecific categories'.

Casas *et al.* (1990) made further studies of *Acaulon* taxa on the Iberian peninsula. They provided SEM micrographs of the sporoderm of Portuguese and French specimens of '*A. muticum* var. *mediterraneum*' and of a French specimen of '*A. muticum* var. *muticum*', which show characters that precisely match those in Stone's (1988) SEMs of Australian *A. mediterraneum* and English *A. muticum*. Furthermore, their SEMs of the sporoderm of four additional *Acaulon* species confirm that each has a species-specific sporoderm structure. Despite the marked difference in the sporoderm, their key attempts to separate *A. muticum* 'var. *muticum*' and 'var. *mediterraneum*' solely on the basis of leaf characters. Nevertheless, it was noted (*op. cit.*, p. 67) that all the Iberian material attributed to *A. muticum* had spiculose spores, 'con las espinas más o menos largas'.

Overall, it would appear from published SEM and TEM micrographs that species-specific sporoderm structures occur consistently in the genus *Acaulon*. This would imply that since their sporoderms differ radically in structure, *A. muticum* and *A. mediterraneum* should be retained as separate species as advocated by Stone (1988), despite the lack of clear-cut differences in their gametophytes. However, caution seems necessary because sporoderm structure has been shown to vary widely within species in at least two other groups of small ephemeral Pottiaceae. Thus, Blockeel (1995) found that *Tortula acaulon* var. *papillosa* mainly differs from var. *acaulon* in having spores with spinose rather than rounded or truncate processes, but that some plants seemed to have truncate and spinose papillae intermixed; similar intermediate spore types have been seen in recent Cornish gatherings (*pers. obs.*). Also, Ros *et al.* (1996) showed that sporoderm structure varies very widely within species in the *Microbryum starckeum* aggregate. Hence, more study of the stability of sporoderm structure in *Acaulon* is desirable before affording *mediterraneum* species rank on the basis of that character alone. Attempts should also be made to seek additional characters allowing separation of *A. muticum* and *mediterraneum*, e.g. on the basis of genetic differences. In the meantime, separate treatment of *A. muticum* var. *mediterraneum* should ensure that distributional and ecological data are recorded separately for the two taxa.

Distribution

A. muticum var. *mediterraneum* is reliably recorded from southern Sweden (Nyholm, 1990), France, Portugal, Spain, Sardinia, Italy, Crete, Turkey (Duell, 1984; Casas *et al.*, 1990; Casas *et al.*, 2001; Cortini Pedrotti, 2001a, 2001b) and southern Australia (Stone, 1988). I have also seen a specimen from Greece (T.L. Blockeel, personal herbarium). *A. muticum* s.str. is reliably recorded from much of northern and central Europe southwards to south-western France (Casas *et al.*, 1990) and in North America (Crum & Anderson, 1981); records from the Mediterranean basin (Sicily, north Africa) and Macaronesia (Duell, 1984) may need to be reassessed. The widely differing geographical ranges of *A. muticum* var. *mediterraneum* and *A. muticum* s.str. strengthen the evidence for their distinctness provided by sporoderm morphology.

Treatment of British records of *A. muticum* var. *mediterraneum* and of *Acaulon* with spiculose spores has remained confused. Braithwaite (1887) gave a record of *A. mediterraneum* from the Isle of Man, but described the spores as 'nearly smooth'. Dixon (1924) rejected *A. mediterraneum* as a British species, but did not mention the spore characters. Smith (1978) made no mention of it. Hill (1982) recorded specimens from East Cornwall and South Somerset with 'spinulose' spores, but as noted above he concluded that *A. mediterraneum* was probably not worth even varietal status. Blockeel (in Hill *et al.*, 1992) refers to records of var. *mediterraneum*: '(sometimes treated as a distinct species ...), with spiny spores, ... known from two localities in S.W. England, but has not been seen since 1935'. Nonetheless, the latest *Census Catalogue* (Blockeel & Long, 1998) fails to mention var. *mediterraneum*.

Ongoing surveys of bryophytes in Cornwall have resulted in several additional records of *A. muticum* var. *mediterraneum*, which appears to be almost as frequent as *A. muticum* s.str. in the county. In order to assess the status of *A. muticum* var. *mediterraneum* over larger areas of southern England, additional specimens of *Acaulon* from vice-counties 1-17 were borrowed from BBSUK, NMW and the herbarium of Mrs J.A. Paton (now at E). The sporoderm was checked for all gatherings with mature spores. Using a light microscope (mainly 'dry' at x400 magnification, supplemented by checks at x1500 magnification using an oil-immersion objective) the spores of *A. muticum* var. *mediterraneum* show conspicuous spicules 2-3 µm high, whereas those of var. *muticum* are granulose with scattered loose perinous material adhering to the surface. In total, the material studied included eight British gatherings referable to *A. muticum* var. *mediterraneum* and 40 referable to var. *muticum*. Intermediate sporoderm structures were not seen, despite examination of thousands of spores from hundreds of capsules.

Specimens of *A. muticum* var. *mediterraneum* with spiculose mature spores have been seen from vice-counties 1, 2 and 3 (see Figure 1). Details of these are as follows:

West Cornwall (VC 1): cliff path, north side of Maen Porth, SW7929, 8 February 1963 (some grown-on until April 1963), J.A. Paton 789 & 790 (D.T. Holyoak, personal herbarium); partly bare moist soil at edge of wet track, N of Gwendreath Farm, SW7317, 15 October and November 1998, D.T. Holyoak & J.A. Paton 98-406 (D.T. Holyoak, personal herbarium); moist soil on path on coastal heath, N of Porthtowan, SW6948, 9 November 1998, D.T. Holyoak 98-409 (D.T. Holyoak, personal herbarium); soil patches on south-facing hillside, near Trefusis Point, SW8133, 10 January 1999, D.T. Holyoak 99-2 (D.T. Holyoak, personal herbarium).

East Cornwall (VC 2): Bodmin, 1893 and 1897, R.V. Tellam (Bodmin Museum); thin soil over rocks in pasture, Talland Bay, SX2251, 30 January 1999, D.T. Holyoak 99-22B (D.T. Holyoak, personal herbarium); unshaded partly bare soil on top of Cornish hedge near path on top of sea cliff, N of Greeb Point, SW8734, 23 January 2002, D.T. Holyoak & F.J. Rumsey 02-11 (D.T. Holyoak, personal herbarium).

South Devon (VC 3): bare places in a field on the headland, with *Ephemerum serratum*, Budleigh Salterton, SY08, 11 November 1956, J. Appleyard (NMW).

The only other British gathering that should clearly be referred to this species was listed by Hill (1982) as having spores 'spinulose with spines c. 2 μ m high':

South Somerset (VC 5): fallow field near Taunton, [ST22], 1935, W. Watson (E).

Specimens of *A. muticum* var. *muticum* with mature spores have been studied from vice-counties 1-3, 6, 8, 10-14, 16 and 17.

It would appear that in Britain *A. muticum* var. *mediterraneum* is restricted to south-western England and is likely to be frequent only in Cornwall, corresponding to the predominantly

Mediterranean range of this taxon in Europe. *A. muticum* var. *muticum* is much more widespread in Britain, corresponding to its wide range across northern and central Europe. In view of its restricted range and few localities in Britain, *A. muticum* var. *mediterraneum* must be regarded as a Nationally Rare taxon and its localities should be protected.

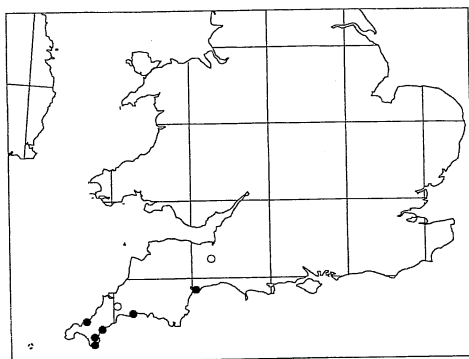


Figure 1. British records of *Acaulon muticum* var. *mediterraneum*. Data are plotted in 10-km squares of the National Grid. Records from before 1950 are shown as open circles, records since 1949 as closed circles.

comments on drafts of this paper, and Tom is also thanked for help with literature and the loan of a Greek specimen. Figure 1 was prepared using the DMAP software developed by Dr Alan Morton.

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EX SITU CONSERVATION OF BRYOPHYTES

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Introduction

When flowering plants are faced with extinction, seed banks, whether stored by nature in the soil or by man off-site, offer one possibility for conserving populations. Why should bryophytes not enjoy a similar safeguard? But how would one go about it? Prompted by the UK Biodiversity Action Plan's exhortation to develop *ex situ* conservation techniques for threatened bryophytes, a pilot project financed by English Nature, Scottish Natural Heritage and the Countryside Council for Wales is underway at the Royal Botanic Gardens Kew. This article outlines progress to date, not least in addressing some of the challenges posed by the work.

Progress so far

The thinking behind the project has developed over several years. A vision of what might be possible was outlined by Ron Porley of English Nature when he addressed the Trustees of Kew in 1997. With their support an international workshop was held in 1999 to discuss what to do and how to do it, and the project got underway in August 2000.

The main aim of the project is to develop techniques and protocols for the collection, propagation and basal storage (storage in a non-metabolic state such as in liquid nitrogen) of rare and threatened British bryophytes. It is a forward-looking, long-term project; waiting until a species is threatened with extinction is not an option. Nor can appropriate techniques be developed overnight; this is a pioneering area of research and novel protocols are being developed. The project is a global first - no other facility anywhere in the world is working towards a threatened bryophyte bank. The project is directed by a Steering Group¹, with the work being undertaken at the Micropropagation Unit at Kew, headed by Margaret Ramsay and assisted by Dr Jane Burch, who was appointed Bryophyte Conservation Officer when the project commenced.

One of Jane's first tasks was to learn tissue culture techniques and how to apply them to the propagation of bryophytes. This is an ongoing process, as techniques suitable for some bryophytes may not be suitable for others, such as *Sphagnum* or thalloid liverworts. That there is nothing intrinsically difficult about growing bryophytes was demonstrated years ago by Michael Fletcher, who assumed that this was what bryology was all about. Another renowned bryo-cultivator is Professor Jeff Duckett, who grows them for experimental purposes. But what Jane was being asked to do was different - presented with just a few shoots, she had to cultivate them on a scale not previously attempted. The biggest challenge she has faced has been cultivating bryophytes free from contamination. Bacterial contamination has been low, with algae and fungi being the main contaminants. Usually either sporophytic or gametophytic tissue is surface-sterilised prior to being placed in culture. However, with so few stems available, material has to be 'bulked up' so that sterilisation trials can be undertaken without risking killing the entire sample. This means that the sterilisation process has to be undertaken on protonemata.

To establish basic protocols, Jane began by using common species such as *Bryum argenteum*, *B. capillare* and *Eurhynchium praelongum*. Algae were eliminated by exploiting the phototropism exhibited by mosses. Inverting the petri-dish, protonemata grow through the medium towards the light, and emerge free of algae. It soon became apparent that fungal contaminants were more resilient to the sterilisation process than the protonemata. However, surface sterilisation against fungal contamination has been achieved with the use of low concentrations of sodium dichloroisocyanurate on aerial protonemata. These techniques are being used to decontaminate all species in the collection. Once the effectiveness of the techniques has been established, using a variety of species, a sterilisation protocol will be produced. Despite the various difficulties, Jane has remained undaunted, regarding them as mere technical challenges to be overcome.

¹ The Steering Group comprises Jane Burch (Kew), Alan Hale (Countryside Council for Wales), Ron Porley (English Nature), Margaret Ramsay (Kew) and Stephen Ward (Scottish Natural Heritage).

Media trials have been carried out using *Ditrichum cornubicum*, investigating the optimum basal salt concentration and gelling agent, and the need, or otherwise, for sucrose. From this it has been established that the medium combination optimal for the growth of *D. cornubicum* is ½ strength Murashige & Skoog (1962) solidified with Gelrite and with no additional sucrose. Sucrose, commonly used in the tissue culture of vascular plants, suppressed protonemal growth of *D. cornubicum*. So far, all the species in culture have been autotrophic (able to produce carbohydrates from inorganic carbon sources). A variety of media are now being used, depending on the nutrient requirements of the species being grown.

When material is frozen, ice crystals within the cells may rupture the cell membranes. Hence a variety of pre-treatments prior to cryopreservation are used to reduce the amount of water within cells and protect them from damage. Cryopreservation trials have been carried out using *Ditrichum cornubicum*, *Bryum rubens* and *Cyclodictyon laetevirens*. From these experiments, it is apparent that some desiccation-tolerant species will survive cryopreservation after a prolonged period of dehydration, whereas desiccation-intolerant species benefit from growth on a medium supplemented with abscisic acid and sucrose. Cryopreservation protocols will be produced once the effectiveness of the techniques has been tested on several species.

Orthodontium gracile is the first species on which both protocols are being tested. If the trials are successful, samples of *O. gracile* from each of its UK sites will be placed in cryo-storage. Once sterile material is available, similar trials will be undertaken on other species in culture. Early indications are that cryopreservation offers a cost-effective method of long-term storage for rare and threatened bryophytes.

A database has been constructed for the specific needs of the project, recording species name, collection site, substrate, name of donor, and detailed records of each stage of propagation. This shows just how dependent the project is on field bryologists. For example, *Ditrichum cornubicum* was donated by the late Harold Whitehouse and had originated from Lanner. After the initial success with culturing this species, a further six Biodiversity Action Plan (BAP) species are now in culture (donors in parentheses):

- *Orthodontium gracile* (Ron Porley and David Long) from sites in England and Scotland
- *Bartramia stricta* (Ron Porley) from Stanner Rocks, Wales (including spores from a 95-year-old capsule)
- *Zygodon forsteri* (Fred Rumsey) from the New Forest
- *Z. gracilis* (Fred Rumsey) from Yorkshire
- *Leptodontium gemmascens* (Fred Rumsey) from Norfolk and Suffolk
- *Ditrichum plumbicola* (Fred Rumsey) from Somerset.

Collection protocols have been developed and can be obtained from Steering Group members.

The pilot project has generated interest internationally. Posters have been presented at the 3rd Planta Europa Conference and the 4th European Conference on the Conservation of Bryophytes (both held in Prague in 2001), at the Countryside Stewardship day at Kew in April 2002, and at the Science for Plant Conservation conference in Dublin in July 2002. A paper on the cryopreservation of protonemata of *Ditrichum cornubicum* has been accepted for

publication (Burch & Wilkinson, in press). A second scientific paper is in preparation detailing the response of bryophytes with varying levels of desiccation-tolerance to cryopreservation.

Where next?

With the project at the halfway stage of the first phase, the Steering Group will shortly be assessing progress and considering whether to seek funding to proceed to a second phase. It will be necessary to consider afresh the candidate species; ongoing survey work has shown that some BAP species are more widespread than was previously known, but on the other hand there may be new deserving candidates to be added to the list of target species.

One of the ultimate aims of any *ex situ* programme is to have material available for re-introduction in the event of the worst-case scenario of a population being lost in the wild. Several British bryophytes are critically endangered and hence vulnerable to catastrophic events. It is not only important to prevent the extinction of threatened species, but also to maintain genetic diversity. The loss of a single population may entail the loss of unique genetic material. Developing tried and tested *ex situ* techniques is essential if emergency situations are to be addressed when they arise. Re-introduction trials are a critical part of this process, and it is envisaged that the project will move into this area. Different techniques may need to be developed for saxicolous and epiphytic species. It is important that such work operates within World Conservation Union (IUCN) and statutory conservation agency guidelines on re-introductions.

One of the first candidates for re-introduction trials will be the endangered *Orthodontium gracile*. Material is being bulked-up from various provenances within the UK. Molecular studies are being undertaken at Kew to identify any inter-population genetic variation - essential data prior to any re-introduction programme. A valuable spin-off from the *ex situ* work on *O. gracile*, and likely to be the key to successful re-establishment trials, is the discovery of protonemal gemmae and brood cells, first in culture and then in the wild (Duckett & Matcham, 2001). Using cultured *O. gracile*, in a partnership with Kew and Queen Mary College, University of London, the project also hopes to learn more about the interaction between this species and the introduced *O. lineare*. As a contribution to this, the Friends of Kew have made £10,000 available from their 'Threatened Plant Appeal' to support re-establishment trials of *O. gracile* over the next four years. Being able to bulk-up rare bryophytes presents unprecedented opportunities for studying, perhaps in controlled environments, the ecological requirements of these species.

BBS members who would like to be shown the growth and cryopreservation trials will be made most welcome. To do so, please make an appointment with Jane Burch (tel: +44 (0)20 8332 5559; fax: +44 (0)20 8332 5124; e-mail: j.burch@rbgkew.org.uk).

References and further reading

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