

St Kilda revisited: Bryophytes on the edge of the world

'Bonxie' attacks, fulmars and wonderful bryophytes: hazards and rewards of bryologising on St Kilda. **Ron Porley, Nick Hodgetts and Clare Rickerby** recount their trip to an island 'on the edge of the world'

It is a measure of the remoteness of St Kilda, located 8°33' E 57°50' N and some 65 km beyond the nearest landfall on the Outer Hebrides, that the rocky and often wind-swept islands are slightly over half an hour later than Greenwich Mean Time. The poignant story of its inhabitants, especially from the 19th century up to their voluntary evacuation in 1930, has been told in a vast body of literature, photographs and film. Visitors today not only marvel at the hardships endured by the island people, but are captivated by the ruggedness and the singular beauty of St Kilda.

The archipelago comprises four main islands, Hirta, the largest and the subject of the present bryological study, Boreray, Soay and Dun (five if Levenish is included, but this is little more than a rock) and imposing sea-stacks that support internationally important sea-bird colonies. Hirta is just over 2 miles long east to west and more or less the same north to south, with an area of about 628 ha. It consists of two valleys or glens surrounded on three sides by lofty hills,

including Chonachair at 430 m and the highest sheer vertical (376 m) sea cliff in the British Isles. The west side of the island, including Mullach Bi, consists predominately of gabbro, with veins of mafic (ultrabasic) dolerites, whilst the east side is largely granophyre and granite, separated by the Mullach Mor ridge, itself a complex of dolerite with sheets of microgranite and microdiorite. St Kilda lies within the zone of 200 wet days per annum (Ratcliffe, 1968), and this is reflected in the strong oceanic bryophyte element. Another significant biotic factor is salt: sea-spray is pervasive. The halophytic moss *Schistidium maritimum* grows not only on rocks on the coast, but in the interior of Hirta too.

History of bryological recording on St Kilda

The first, and rather meagre, St Kilda bryophyte collections date from the beginning of the last century. The dearth of early records is undoubtedly in part due to the islands' remoteness and inaccessibility. Derek A. Ratcliffe (1929-2005) visited St Kilda for about two weeks in 1959 on



△Above: St Kilda archipelago on a distant horizon. RD Porley

the cusp of a new era of bryophyte recording on the islands. In the seminal *Nature Conservation Review* (Ratcliffe, 1977) the entry for St Kilda mentioned the presence of the southern Mediterranean-Atlantic *Fossombronia angulosa*, and the wide distribution of such hygrophilous oceanic plants such as *Frullania teneriffae*, but the bryological interest remained understated (perhaps eclipsed by the seabirds). In 1989 DAR presented a large part of his bryophyte herbarium to the Royal Botanic Garden Edinburgh (RBGE), and subsequently his field notes and additional bryophyte specimens relating to St Kilda. In 1991 David G. Long added substantially to our bryophyte knowledge of St Kilda, even though his collecting opportunities were limited by time and poor weather. In 1994 RBGE acquired the bryophyte herbarium of the Nature Conservancy Council which included a number of St Kilda vouchers. Pulling all the available data together for the first time, DGL tracked down just about every bryophyte ever collected on Hirta and checked the identifications; the exceptional

bryological interest of St Kilda (especially Hirta) was at last recognized and documented (Long & Ratcliffe, 1996). A further opportunity arose in 2010 for DGL to visit St Kilda, but the weather was so bad that time on Hirta was again fleeting. However, the stopover did produce 17 new species, including the rare oceanic liverwort *Acrobolbus wilsonii*, new to the Outer Hebrides, and the first hornworts for the island, *Anthoceros punctatus* and *Phaeoceros laevis*.

Bryophyte survey of Hirta, 8-13 July 2013

Amongst the many other interests on the islands, there is a need for up-to-date biodiversity data to inform nature conservation policy. In the 2012-2017 Management Plan there is a brief section on bryophytes and lichens. Objective 10 reads “To gain a greater understanding of the important plant communities on the archipelago, especially the bryophyte and lichen communities”. Prescription 10.1 follows: “Identify the main locations of the bryophyte and lichen communities on the archipelago and



△Above, Left: The church, manse and school room on Hirta, overlooking Village Bay with our boat (red) at anchor. RD Porley. Right: Fulmars are an occupational hazard for bryologists. RD Porley

maintain a list of these species”. Against this background in 2013 the NTS (National Trust for Scotland) put out a tender for a bryophyte survey of Hirta, and so it was that three slightly green bryologists disembarked on St Kilda (the crew told us that the voyage was relatively calm; we did not wish to contemplate the voyage in more challenging conditions). Bryophytes new to St Kilda are indicated with an asterisk.

Day 1, 8th July

At 08.30 on a cool misty morning we boarded our boat, operated by Kilda Cruises, at Leverburgh on Harris (having camped close by the previous evening). The speed of the boat crashing over the waves made standing on deck tricky and using binoculars all but impossible.

We settled in to the 3-hour trip as best as we could, full of anticipation of what was to come. After what seemed an eternity, Hirta emerged from a veil of mist and Village Bay materialized before us. An inflatable transferred us to the pier and with some relief we stood on solid land (OK, concrete). There to greet us were the NTS warden

Pete Holden and the eminent (and very jovial) lichenologist Brian Coppins. The latter had arrived on the island a few days previously along with Andy Acton, John Douglass and Steve Price to record lichens. During the next 6 days we were to share mealtimes and a few drinks together and enjoyed each other’s company immensely.

However, there was no time to waste so we hauled all our gear and food for a week and more (just in case we were unable to leave the island on the prearranged day due to bad weather) up hill to ‘The Street’, to our rustic but comfortable accommodation in the restored 1860s stone houses looking over to Dun and to the Atlantic Ocean beyond. One restored house doubled as an amazingly well-equipped kitchen and laboratory area. The morning ablutions necessitated a walk of a few hundred metres, though the hot showers in the modern purpose-built block provided a welcome indulgence. With our appetites sated and our vigour restored we got down to some recording, intent on the ground in and around Village Bay by way of a gentle lead-in to St Kilda bryophytes. The lower south-west facing slopes



△Above: The Street, shown by the row of grey-roofed houses, provided our accommodation and the grey modern building at bottom-left for ablutions, all surrounded by the distinctive stone cleits. The S-facing scree supports *Bazzania trilobata* and *Grimmia muehlenbeckii* and the burn Abhainn Mhor is seen top-left. RD Porley

of Oisebhal turned out to be too dry and closely cropped by sheep to be of much interest, so we dropped down to the ruderal areas close to the sea, around the church and manse, amongst the military installations and over to the beach head as far as the burn known as Abhainn Mhor. Immediately the diversity increased, with **Zygodon conoideus* on a sheltered concrete wall of the 'Store' building (not *Z. viridissimus* as one might expect), **Schistidium crassipilum*, **Henmediella heimii*, **Tortula viridifolia*, possible **T. modica* (unfortunately sporophytes were lacking) and the pleurocarps **Amblystegium serpens* var. *serpens* and **var. salinum*, **Campylium protensum* and **Drepanocladus polygamus*. The low cliffs above the beach and the lower stretch of Abhainn Mhor consist of locally derived till deposit with boulders in a gravel and sand mixture, evidence of a former glaciation, and is bryologically interesting with *Fossombronina angulosa* (St Kilda being the most northerly British station for this predominately southern species), *Philonotis fontana* (very small, looking like *P. rigida*), **Tortella flavovirens*, **Weissia*

perssonii (oddly not yet recorded elsewhere in the Outer Hebrides) and more **Henmediella heimii* and **Tortula viridifolia*. The St Kilda wren was in full song, skulking between the large boulders. At the mouth of Abhainn Mhor was **Cephalozia pleniceps* intimately mixed with *Sphagnum subnitens*, but we were unable to re-find the two hornworts reported by DGL in 2010. A smaller unnamed burn to the east of the bay, although less interesting overall, supports *Sciuro-hypnum plumosum* on a boulder at its only site on the island.

Day 2, 9th July

This was our first full day, and in fine weather we began not too far from the Village, on the NE facing slopes and scree of Clash na Bearnaich. Moranic ridges on the lower slopes are evidence of a small valley glacier that occupied Village Bay during the Devensian glaciation maximum. The rather dry scree and hill slope grassland were however not offering up much of interest, apart from **Fissidens dubius* and **Kurzia sylvatica* on a peaty ledge, so we gained height to reach the



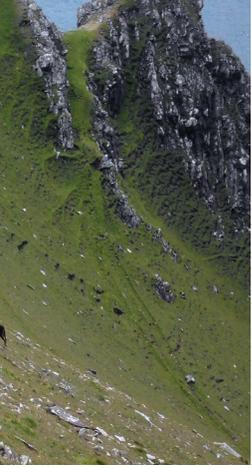
△Left to right: The globally rare *Acrobolbus wilsonii*, possibly more abundant on Hirta than any other place in the British Isles. RD Porley. Soay sheep on Ruabhal - this ancient breed displays wide colour variation. RD Porley. The southern end of Ruabhal and the 'Mistress Stone'. RD Porley

crags and gullies above. In one particular small gully we were rewarded with finding *Acrobolbus wilsonii* on a mossy ledge, but the largest and most bryologically diverse gully here is known locally as The Chimney (there is a 'tradition' in which one has to ascend The Chimney in the shortest time possible, although we decided bryological speed was much more appropriate for us). Its mid-point is about 160 m a.s.l., and gives shelter to many oceanic bryophytes including *Colura cabyptrifolia*, *Harpalejeunea molleri* (epiphytic on the ubiquitous *Frullania teneriffae*), *Herbertus aduncus* subsp. *hutchinsiae*, *Hypnum callichroum*, *Plagiochila bifaria*, *P. punctata*, *P. spinulosa*, *Radula aquilegia*, *R. lindenbergiana*, *Saccogyna viticulosa* and on

spongy turf ledges amongst rocks plentiful *Acrobolbus wilsonii*. This Nationally Scarce and globally rare liverwort possibly occurs on Hirta in greater abundance than at any other site in the British Isles. After lunch, taken amongst the fulmars but at a prudent distance, we made a bee-line for the southernmost tip of Ruabhal, looking over to Dun. On the west side of Ruabhal is an area of *Plantago maritima* turf, this is possibly too disturbed by sea-birds to be of interest for bryophytes, although in maritime turf amongst rock outcrops was more *Henediella heimii*, *Tortula viridifolia* and a distinctive form of *Amblystegium serpens* with homomallous branch and stem tip leaves suggestive of the var. *litorale* as described in Nyholm (1954). Our attention

▽Left to right: In the 'Chimney' with *Frullania teneriffae*, *Herbertus aduncus* subsp. *hutchinsiae*, *Hypnum callichroum*, *Plagiochila* spp., *Harpalejeunea molleri* and frequent *Acrobolbus wilsonii*. NG Hodgetts. Below the radar installation on Ruabhal, assessing the population of *Sanionia orthothecioides* in *Agrostis-Nardus* turf. NG Hodgetts. Next page: The Boreo arctic montane *Sanionia orthothecioides*, or St Kilda Hook-moss, was first discovered in Britain on Hirta. RD Porley





was then drawn away from the mosses to a bizarre rock outcrop resembling a portal with a huge precariously balanced lintel, the whole thing teetering on the edge of a sheer cliff that plummets hundreds of metres to the rocks below, known to the St Kildans as ‘The Mistress Stone’. Martin (1749) described the ritual associated with this rock:

‘Upon the Lintel of this Door, every bachelor-Wooer is by an ancient Custom obliged in Honours to give a Specimen of his Affection for the Love of his Mistress, and it is thus; He is to stand on his left Foot, having the one half of his sole over the Rock, and then he draws the right Foot further out to the left, and in this Posture bowing, puts both his Fists further out to the right Foot; and then after he has performed this, he has acquired on small reputation, being always after it accounted worthy of the finest Mistress in the World.’

Possibly in anticipation of an interesting *Grimmia*, RDP scrambled on to the Mistress Stone, wavering transitorily over the precipitous cliff. Regrettably no one actually witnessed this event, and worse still no *Grimmia* was found.

Turning our backs to the Mistress Stone, we trekked north along a grassy ridge. Just below the radar mast on the summit of Ruabhal at about 200 m we found *Sanionia orthothecioides*, the first of many colonies on Hirta of this fine moss, mostly distributed along the western Mullach Bi ridge and in similar habitats on the eastern slopes of Conachair and the north-facing slopes of The Gap, north of Oisebhal. Also known as St Kilda Hook-moss, *Sanionia orthothecioides* was collected by D. A. Ratcliffe in 1959 from Hirta

as ‘*Drepanocladus uncinatus* var.’ thus signifying that he considered it to be atypical. DAR sent two collections to E. F. Warburg who recognized it as being close to var. *orthothecioides* (Lindb.) Moenk. However, DAR’s collections languished unsorted in newspaper packets in his garage in Cambridge until 1990 when DGL rescued them and discovered *Sanionia orthothecioides*, recently reviewed by Hedenäs (1989), and published it new to Britain in 1992 (Long, 1992). However, this may not be the first collection in Britain. In 1958 D. N. McVean undertook floristic recording of vegetation on St Kilda and presented relevés from mixed grassland on Mullach Sgar





◁Left top to bottom: On the edge of the world: the rocky ridge of Mullach Bi momentarily reveals itself through a gap in the mist. C Rickerby. *Schistidium maritimum*, *Ulota phyllantha* and *Glyphomitrium daviesii* jostle for position on the rocks, Mullach Bi. RD Porley. △Above: The Oceanic Southern-temperate *Glyphomitrium daviesii*, on Hirta confined to the basic outcrops of Mullach Bi. RD Porley. ▷Right, top to bottom: The Hyperoceanic liverwort *Radula aquilegia* is frequent on Hirta. RD Porley. Hepatic-rich *Plantago maritima* turf above Glen Bay, including *Geocalyx graveolens*. NG Hodgets

listing, amongst other bryophytes, *Drepanocladus uncinatus* (McVean, 1961). There is no vouchered collection of *D. [Sanionia] uncinatus* from St Kilda, so McVean's record most likely refers to *S. orthothecioides*. In the present study we typically found this moss in 10-12 cm tall *Festuca-Nardus* grassland just below a ridge on the leeward side with *Thymus polytrichus*, *Euphrasia* sp. and *Rhytidiadelphus squarrosus*.

Day 3, 10th July

The target today was Mullach Bi, a long chain of outcropping gabbro rocks (the oldest on Hirta) on the west side of the island. To expedite access we elected to ascend the Military Road (built in 1957) winding its way to the top of Mullach Mor, except that we peeled off west at about 240 m, traversing Mullach Sgar moorland to bring us to the southern point of Mullach Bi at Claiageann Mor. In very warm conditions we

trudged up the hard-surface road, our attention diverted momentarily by a concrete culvert which supported **Schistidium crassipilum*. Mullach Bi is known for its rich bryoflora and it did not disappoint, despite the mist that hung in the air depriving us of spectacular views. The rocks are dotted with *Schistidium maritimum* and *Ulota phyllantha* and *Racomitrium fasciculare* is everywhere. *Frullania* is a significant part of the bryophyte community, with *F. teneriffae* especially abundant, including a rare dwarf form of it known previously in Ireland, but *F. fragilifolia* and *F. tamarisci* are also frequent.

The oceanic moss *Glyphomitrium daviesii* also adorns the rocks, sterile cushions necessitating careful examination as *Racomitrium ellipticum* is also locally common here. *Andreaea rupestris* occurs in small quantity, and more rarely *Grimmia trichophylla* and, surprisingly, **G. muehlenbeckii*. Both these species presented facies indicative of the harsh conditions on Hirta (at least for *Grimmia*). Present too is **Schistidium maritimum* var. *piliferum*, marked by its hyaline hair point. This taxon was reported new to the



British Isles recently (Hodgetts, 2010) from Shetland, and is frequent on Mullach Bi. The precise nature of this taxon needs further study but is otherwise known from Fennoscandia, NW Russia, Svalbard, Greenland and N. America. More sheltered and shaded rocks, especially dark declivities and beneath overhangs, support oceanic species such as *Aphanolejeunea microscopica*, *Colura calyptrifolia*, *Harpalejeunea molleri*, **Metzgeria violacea*, *Radula aquilegia*, **R. lindenbergiana* and the moss *Isoetecium myosuroides* var. *brachythecioides*, a common taxon on Hirta. Moving along the NE-facing slopes below Mullach Bi, we stumbled across a great skua chick beautifully camouflaged on the grassy ground; this explained why a couple of adult 'bonxies' were agitated and urged us onward, but not before we found *Heterocladium wulfsbergii* amongst *Chiloscyphus polyanthos* in a small flush. Spongy turf on peaty ledges and moist slopes are rich in bryophytes. These include *Acrobolbus wilsonii*, *Alepharostoma trichophyllum*, **Riccardia palmata*, *Scapania scandica*, *S. umbrosa* and *Tritomaria exsectiformis*, with the larger and more conspicuous tufts of *Herbertus aduncus* subsp. *hutchinsiae*, *Plagiochila spinulosa* and more rarely **Mylia taylorii* amongst the rocks. *Mnium hornum* is also common in such places, forming dense tussocks or scattered shoots, finding a niche on an island with no woodland.

Eventually the mist evaporated, unlocking the spectacular views but time was ticking away so we dropped down into Glen Bay. We were soon stopped in our tracks however by several patches of tightly grazed *Plantago maritima* turf forming



slightly raised domes and rich in hepatics including *Cephalozia bicuspidata*, *Diplophyllum albicans*, *Frullania tamarisci*, *Lejeunea patens*, **Lophozia incisa*, *L. ventricosa*, *Radula aquilegia*, *Saccogyna viticulosa* and *Scapania gracilis* and to our astonishment *Geocalyx graveolens*. The mosses *Aulacomnium palustre*, *Campylopus brevipilus* and *Isoetecium myosuroides* var. *brachythecioides* are also present as components of the turf. Realising that we had rather lost track of time we pushed on up Abhainn a' Ghlinne Mhor, a burn that would take us up to the ridge to join the Military Road. Along the way the bonxies launched their offensive (Gleann Mor is their breeding ground) but undeterred we came across a good population of *Fossombronia angulosa* and the only site on the island for *Conocephalum conicum*. That evening storm petrels were seen over the Bay as the light was fading, although darkness never seems to visit this far north during summer nights.



△Above, left to right: Poles extended at the ready to deflect the annoying ‘bonxie’ attacks in Gleann Mor. RD Porley. Searching for *Sanionia orthothecioides* on Mullach Bi. NG Hodgetts. ▽Below: From An Campar looking back at the *Plantago* turf (at the narrowest point) with Mullach Bi disappearing to the right, and Mullach Mor and the Peak of Conachair rising to the left. C Rickerby

Day 4, 11th July

Part of our objective was to visit each 10 km square and record species distributions across the island. So once again we retraced our steps up the Military Road eventually to join Mullach Bi where we had finished recording yesterday. Today, given the beautiful weather, we would continue north along the top of the cliffs focusing on the upper line of crags and onto the peninsula of An Campar. We were soon picking up *Acrobolbus wilsonii* on mossy ledges mixed with *Blepharostoma trichophyllum* and more *Scapania scandica* and *S. umbrosa*. A large cleft in the cliffs supported much *Radula aquilegia*, a commonly encountered species in sheltered spots on the island, with *Lophocolea fragrans* and *Aphanolejeunea microscopica*. On exposed rocks a curious highly gemmiferous form of

Metzgeria furcata was found (presumably the taxon known as ‘variety *ulvula*’), and a colony of **Porella cordaeana* lurked in a dark humid ‘cave’ overlooking the peninsula.

Descending to An Campar, we were before too long treading on a large spongy raised dome of *Plantago maritima* turf. Referable to MC10 of the National Vegetation Classification, it is said to be poor in bryophytes, but on Hirta it is hepatic-rich, distinctive and to the best of our knowledge, a unique undescribed variant. Fresh in our minds from our encounter yesterday with a similar vegetation type in Glen Bay, we dropped onto hands and knees in anticipation. The hepatic-rich turf, 1-2 cm tall, was at first perplexing with miniaturized vascular plants and bryophytes but one by one we teased out the species. It proved to be exceptionally interesting.





△Above: *Plantago maritima* turf, with *P. coronopus* and a pure patch of *Geocalyx graveolens*, an under-recognised variant of NVC: MC10. RD Porley

Geocalyx graveolens occurs in greater quantity than we have ever seen in the British Isles, forming pure yellow-green mats 1-2 cm across. *Lophocolea bidentata* was throughout the turf and was checked carefully with the lens in case it was *Geocalyx*, but then another lookalike revealed itself, the Western British **Harpanthus scutatus*, separated only with some difficulty by searching for its relatively large underleaves. The list of bryophytes in the *Plantago* turf was impressive: *Blepharostoma trichophyllum*, *Cephalozia bicuspidata*, *Lejeunea patens*, *Lophozia ventricosa* and *Nardia scalaris* and amongst the mosses **Campylium protensum*, *Hypnum cupressiforme*, *Isoetecium myosuroides* var. *brachythecioides*, *Mnium hornum* and *Sphagnum subnitens*, all packed closely together with *Armeria maritima*, *Festuca rubra*, *Leontodon autumnalis*, *Plantago coronopus* and *Sagina procumbens*.

The occurrence of *Plantago maritima* dominated maritime turf on Hirta is well documented. Petch (1933) identified a maritime vegetation type on Hirta influenced by sea-spray and dominated by *Plantago* at Ruabhal, Gleann Mor and Gob na h-Airde, and Poore, Robertson & Godwin (1949) added An Campar. However, bryophytes are conspicuous by their absence from their floristic tables. McVean (1961) did include bryophytes in his floristic tables from An

Campar and it compares very well with our data even though *Geocalyx graveolens* was not recorded (possibly it was overlooked or not present 50 years ago). The *Plantago* turf overlies a type of dense, friable peat (over 1 m deep on An Campar) and develops under sustained grazing. The island once supported c. 1300 black-face sheep, and since 1931 Soay sheep have grazed Hirta, averaging about 1,200 animals with population crashes every four years or so (Love, 2009). Sheep are known to relish *Plantago maritima* and clearly spend much time on these areas. The *Plantago* turf occurs on gently sloping sites at relatively low elevations and is drenched with sea-spray, thus although the peat is acidic it has a high base saturation due to exchangeable magnesium and sodium. How the hepatics survive such high salt levels though is a subject for further research.

With soggy knees we left the *Plantago* turf behind and headed due north to reach the very end of An Campar peninsula. Although little of bryological interest was found the views over to Soay, Boreraig and the sea-stacks were stunning and we marvelled at a red admiral butterfly, which had somehow journeyed all the way to St Kilda. Turning our faces to home, we trudged back over Gleann Mor once more through bonxie territory, adding *Dicranum bonjeanii*, *Hyocomium amoricum* and *Scorpidium cossonii* to the day's list. We did not know it at the



△Above, top to bottom: The military road winding it's way up to Mullach Mor, with the abandoned quarry to the right with *Cephaloziella integerrima*, and the burn Abhainn Mhor below. RD Porley. Village Bay seen from the scree at Glacan Conachair (at the bottom of the photo), with Dun in the distance. The military installations and concrete pier allowing relatively safe disembarkation are to the left. RD Porley. ▷Next page: The island of Boreray, with Stac Lee in front and Stac an Armin to the left. RD Porley

time, but a snowy owl had taken up residence on one of the numerous cleits in the vastness of Gleann Mor; we mused over our bad luck of missing such a 'tick' but consoled ourselves with the thought of the proverbial needle in a haystack. Later, by way of compensation, we watched a St Kilda field mouse foraging for scraps of food while we ate our evening meal outside our headquarters house.

Day 5, 12th July

Abhainn Mhor, the largest gully on the island to the west of Village Bay was the focus for the

morning's work. It was carrying just a trickle of water, ideal for bryophyte-hunting on rocks and along the banks, although much of the ground in the gully was scoured and some significant finds by David Long in 1991 (e.g. *Bryum dixonii*, *Solenostoma subellipticum*) could not be re-found. A reasonable range of species were present however, including *Glyphomitrium daviesii*, *Nardia compressa*, *Ptychomitrium polyphyllum* and **Racomitrium affine* on rocks and *Anomobryum julaceum*, *Marsupella emarginata* and *Riccardia latifrons* on earth banks. A diversion to Cnoc a Bheannaichta, the site of an old quarry originally opened to provide rock for the military road, turned out to be fortuitous. Amongst the *Nardia scalaris* on the quarry floor were many other pioneer bryophytes including *Dichodontium pellucidum*, *Didymodon fallax*, **Racomitrium elongatum*, **Scapania nemorea* and a minute leafy hepatic that in the field was thought to be a *Lophozia*, possibly *bicrenata*. However, later examination showed it to be the Red Listed (VU) **Cephaloziella integerrima*, hitherto unknown from Scotland, and elsewhere in the British Isles known only from a few spots in southern England and Ireland. Its southern distribution in Britain is odd, as it shows a more northern distribution in Europe, so perhaps it should not be so unexpected on Hirta. Outside Europe it is otherwise known only from subarctic N. America.

Continuing up the burn we added a few more species to the list including **Oligotrichum hercynicum*, **Polytrichum commune* var. *perigoniale* and more *Racomitrium elongatum*. Another interesting taxon, recorded throughout the island, is *Fissidens bryoides* var. *caespitans* (characterised by the dense tomentum of deep red rhizoids). This oceanic southern-temperate taxon (formerly known as *F. curnovii*) completely supplants the generally more common var. *bryoides* on Hirta.

Having reached the head of the burn we put on coats against the chill and proceeded north in heavy mist to the bealach between Mullach Mor and the grassy slopes of Chonachair. An expanse of old peat cuttings are being recolonized by a range of *Sphagnum*, including **S. cuspidatum*, *S. denticulatum* and even **S. magellanicum* in the wetter hollows, and several stands of **S. fimbriatum* and **S. flexuosum* were also found, as well as more expected species such as *S. capillifolium* subsp. *rubellum*, *S. fallax*, *S. palustre*, *S. papillosum*, *S. subnitens* and *S. tenellum*. Associated liverworts found here include **Calypogeia sphagnicola*, **Cephalozia pleniceps*, **Cephaloziella hampeana* and **Mylia anomala*. *Campylopus gracilis* was also found, albeit in a different location to where D. A. Ratcliffe reported it in 1959 (slopes of Oisebhal, not re-found). The thick mist soon hid us from each other so we re-grouped and continued around the east flank of Chonachair catching glimpses of the towering sea-cliffs with seals hauled out on rocks far below. We huddled close to the ground to escape the buffeting wind, and in so doing discovered a good population of *Sanionia orthothecoides*. Quite unexpectedly we came across a propeller of an aircraft that crashed into

Chonachair in 1943 during a training exercise, a poignant reminder of how perilous these islands can be (another aircraft, a Sunderland, came down in 1944 with the loss of ten airmen; the wreckage is still present at the head of Gleann Mor). We found a brief respite from the gusting wind on the lee side of the hill in an area of springy *Luzula sylvatica* turf, a bryophyte unfriendly niche. On our descent to Village Bay the mist finally thinned to reveal an amazing landscape of shielings and cleits with The Street curving away into the distance, beckoning us home.

Day 6, 13th July

Our last day on Hirta broke fine and clear. After having had an eye on it all week, RDP opted to work the boulder scree at Glacan Chonachair and the crags immediately below the imposing peak of Chonachair. Despite being relatively accessible to Village Bay it turned up some surprises. The south-facing boulder scree concealed Lilliputian woodland of dwarf *Calluna*. Here, a rich bryophyte flora nestled, including *Rhytidiadelphus triquetrus* and *R. loreus*, *Dicranum majus*, *Frullania teneriffae*, *Mnium hornum*, *Plagiothecium undulatum*, *Thuidium tamariscinum*, *Hylocomium splendens*,



Hookeria lucens, *Hypnum callichroum*, *Leucobryum glaucum*, **Plagiochila bifaria*, *P. punctata*, *Saccogyna viticulosa* and the filmy fern *Hymenophyllum wilsonii*. *Acrobolbus wilsonii* creeps through the bryophyte turf, with **Bazzania trilobata*, a species not previously recorded in the Outer Hebrides (VC110), most likely due to lack of woodland. *Aphanolejeunea microscopica* is epiphytic on *Isothecium myosuroides* var. *brachythecioides* and **Plagiochila bifaria*. On rock *Frullania fragilifolia* is frequent, together with *F. microphylla*, *Ptychomitrium polyphyllum* and more rarely *Grimmia trichophylla* and **G. muehlenbeckii*. The steep crags high above the scree, complete with fulmars, are not especially rich, but one wet crag face supported **Andreaea rothii* subsp. *falcata* (the only known site on the island) amongst much *Racomitrium aquaticum* and *Marsupella emarginata*. Meanwhile, NGH and CLR covered the stony slopes of Oisebhal (spelt as such on OS 1:25,000 map but also known as Oiseval) further west where the south facing slopes are very steep and dry with heavily grazed and wind-clipped heather. *Rhytidiadelphus triquetrus* was quite common here, and also colonizing bare patches was *Campylopus introflexus* in greater abundance than seen elsewhere on the island. After an unsuccessful search for *Campylopus gracilis* near the summit of Oisebhal we gradually headed back down the Glen trying to avoid tireless bonxie and arctic skua attacks!

By 15.00 we had to be ready to leave the island. We snatched a quick lunch and then carried all our gear down to the pier. There was just enough time to look in the restored church (built 1830), manse and school room, and to buy souvenirs from the NTS shop. One can even send postcards franked with a special post mark, a reminder of the time when St Kilda had its own Post Office which was crucial to its contact with the outside

world, a service provided today by The St Kilda Club. Although in our hearts we were a little sad to be leaving Hirta, we were excited by the unanticipated news that on the voyage back we would go via Boreray and the sea-stacks. St Kilda is the most important seabird breeding station in north-west Europe with around one million birds which once were vital to the survival of the islanders.

Lichenologists and bryologists donned life jackets and woolly hats, boarded the Kilda Cruises vessel with binoculars at the ready. As we approached Boreray and the sea-stacks the tiny specks from a distance morphed into a noisy wheeling mass of sea-birds. Disturbed by our boat, gannets launched themselves off the guano-plastered cliffs and stacks and soared above. There are estimated to be some 60,000 pairs of gannets on St Kilda, the world's largest colony. It is also home to the oldest and largest colony of fulmars in Britain with about 68,000 pairs, and the largest colony of puffins in Britain with over 140,000 pairs, and many sea-birds including manx shearwater, kittiwake, guillemot and razorbills. It was hard to take the whole scene in: Stac an Armin rising 191 m from the sea, the highest in the British Isles, and Stac Lee 172 m high, the swell of the Atlantic, the cacophony above our heads and even (occasionally) the stench in our nostrils. It was an experience *on a par* with other great wildlife spectacles on the planet, a perfect culmination of our voyage to the edge of the world.

Post-expedition conclusions

Our trip to St Kilda was bryologically very successful (in no small part due to our luck with good weather), and built upon the work of David Long and Derek Ratcliffe. Only 11 previously recorded bryophyte taxa were not found in 2013 (it is likely that some or most of these are still



△Above: Gannet city on Stac Lee, a maelstrom of soaring birds and a crescendo of sound provide an unforgettable experience. C Rickerby

present, although others may have been transient occurrences). Prior to our trip, there were 180 bryophyte taxa recorded from Hirta (including *Radula lindenbergiana* in 1959 and *Schistidium apocarpum sens. lat.* in 1904). Of the 221 taxa recorded during the 2013 survey, 54 are new to Hirta (including *Schistidium crassipilum* but not *Radula lindenbergiana*). Sixteen taxa are newly recorded or de-bracketed for Outer Hebrides (VC 110) and one taxon is new to Scotland. A total of 233 bryophyte taxa are now known on Hirta (Hodgetts *et al.*, 2013). By comparison, Hirta is known to support about 140 species of vascular plants, and none is Nationally Rare or Scarce except for two *Euphrasia* species (Crawley, 1993). A detailed report of our visit including a full species list has been submitted to NTS (Hodgetts, Rickerby & Porley, 2013).

It is clear that Hirta is astonishingly rich in bryophytes. It is particularly important for its suite of oceanic (Atlantic) species, and for the presence of several rare or scarce taxa and species otherwise unknown in the Outer Hebrides. As

noted by Long & Ratcliffe (1996), the oceanic element is the most interesting phytogeographical feature of Hirta, mostly associated with wet rocks and spongy turf amongst rocky outcrops. Hirta supports perhaps the largest and most important population of *Acrobolbus wilsonii* in the British Isles. An impoverished expression of the 'North Atlantic mixed hepatic mat' community occurs on the steep NE-facing slopes of Mullach Bi and Ruabhal, with *Bazzania tricrenata* and *Herbertus aduncus* subsp. *hutchinsiae* the dominant species. There is also a distinct southern element in the bryophyte flora of St Kilda, presumably due to the relatively high mean winter temperature. This includes Mediterranean-Atlantic species such as *Anthoceros punctatus* (recorded in 2010), *Entosthodon attenuatus*, *Fossombronina angulosa* and *Tortula viridifolia* (the latter two especially rare and unusual in western Scotland) and southern-temperate species such as *Lophocolea fragrans*, *Fissidens bryoides* var. *caespitans*, *Glyphomitrium daviesii*, *Ptychomitrium polyphyllum*, *Saccogyna viticulosa* and a good variety of small

hyperoceanic southern-temperate liverworts. The northern element in the bryophyte flora is most significantly represented by *Cephaloziella integerrima*, a mainly northern species with an anomalous southern distribution in the British Isles, *Sanionia orthothecioides*, which has a large and important population here, and *Schistidium maritimum* subsp. *piliferum*. Perhaps of most interest is the hepatic-rich spongy *Plantago maritima* turf; similar vegetation has been observed elsewhere in the Hebrides, in the Shetland Islands and in Ireland, but the species composition seems to vary considerably from site to site. The prominence of the rare *Geocalyx graveolens* is a particularly noteworthy feature of this habitat on Hirta. More intensive survey and subsequent monitoring of this community on An Campar, above Glen Bay and Gob na h-Airde would be desirable in view of its rarity and significance. A vegetation survey comparing the *Plantago* habitat with that in Shetland and other parts of the British Isles would be extremely interesting, as it clearly differs from 'typical' MC10, and is currently an undefined element of British vegetation.

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References

- Crawley, M.J. (1993)** *The flora of St Kilda*. Imperial College, Silwood Park.
- Hedenäs, L. (1989)** The genus *Sanionia* (Musci) in Northwestern Europe, a taxonomic revision. *Annales Botanici Fennici* **26**: 399-419.
- Hodgetts, N.G. (2010)** *Schistidium maritimum* (Sm. ex R.Scott) Bruch & Schimp. subsp. *piliferum* (I.Hagen) B.Bremer in Shetland, new to the British Isles. *Journal of Bryology* **32**: 296-298.
- Hodgetts, N.G., Rickerby, C. & Porley, R.D. (2013)** *Bryophyte survey of Hirta, St Kilda*. Report for the National Trust of Scotland.
- Long, D.G. (1992)** *Sanionia orthothecioides* (Lindb.) Loeske in Scotland, new to the British Isles. *Journal of Bryology* **17**: 111-117.
- Long, D.G. & Ratcliffe, D.A. (1996)** Bryophytes of Hirta, St Kilda. *Journal of Bryology* **19**: 89-111.
- Love, J.A. (2009)** *A natural history of St Kilda*. Edinburgh: Birlinn.
- Martin, M. (1749)** *A Voyage to St. Kilda. The remotest of all the Hebrides or Western Isles of Scotland (1949)*. (Reprint 2010, Kessinger Legacy Reprints).
- McVean, D.N. (1961)** Flora and vegetation of the islands of St Kilda and North Rona in 1958. *Journal of Ecology* **49**: 39-54.
- Nyholm, E. (1954)** *Illustrated moss flora of Fennoscandia. II. Musci*, Fasc 5. Lund: Gleerup.
- Petch, C.P. (1933)** The vegetation of St. Kilda. *Journal of Ecology* **21**: 92-100.
- Poore, M.E.D., Robertson, V.C. & Godwin H. (1949)** The vegetation of St Kilda in 1948. *Journal of Ecology* **37**: 82-99.
- Ratcliffe, D.A. (1977)** *A Nature Conservation Review. Vol. 2*. Cambridge: Cambridge University Press.
- Ratcliffe, D.A. (1968)** An ecological account of Atlantic bryophytes in the British Isles. *New Phytologist* **67**: 365-439.
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