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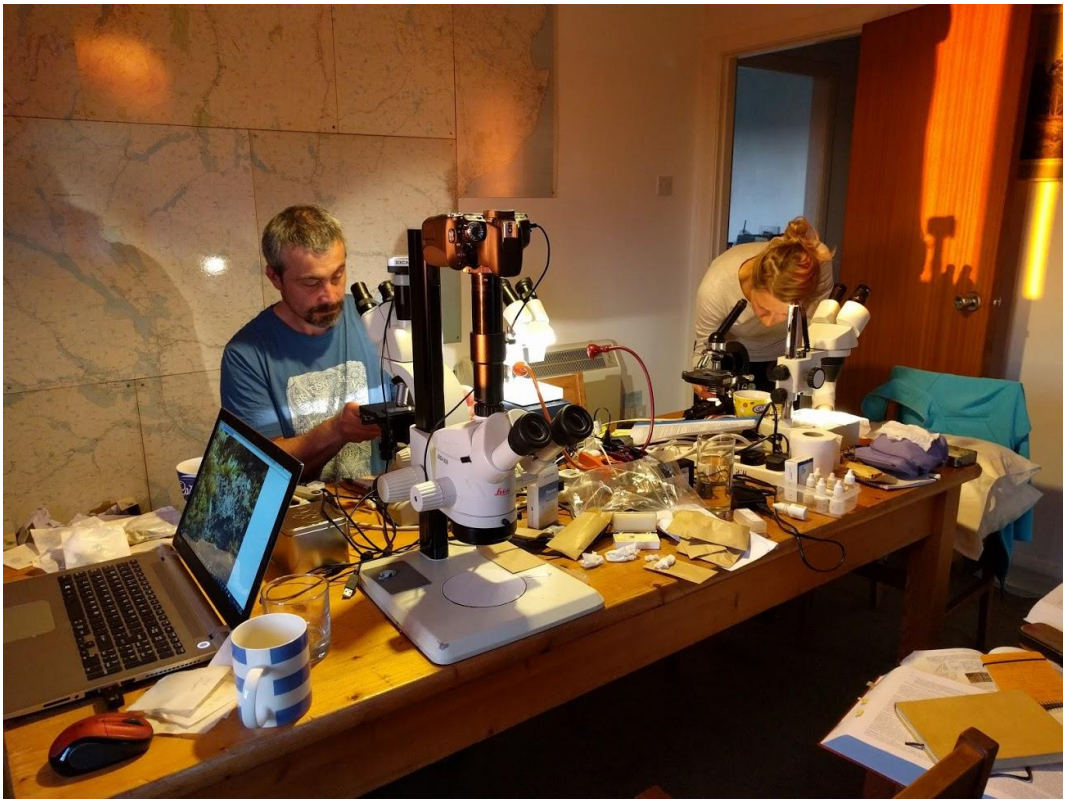
Lost and Found lichens: visit to Sutherland 18–25 June 2016

This is a report of a survey visit for the Lost and Found Fungi project managed by RBG Kew (*http://fungi.myspecies.info/content/lost-found-fungi-project*). Many thanks to the Esmée Fairbairn Foundation for the funding.



The six lichenologists included Paul Cannon (Royal Botanic Gardens, Kew), John Douglass, a freelance field lichenologist, Steve Price (an amateur lichenologist and British Lichen Society field meetings organiser) Kristine Bogomazova (PhD student in lichen taxonomy at Royal Botanic Gardens, Edinburgh), Sally Ward from Scottish Natural Heritage, a recent attendee at the Kindrogan Field Studies Council lichen course and Heather Paul, an intermediate amateur.

The week aimed to do targeted searches for lichens and one non-lichenized fungus which might be genuinely rare or just seriously under-recorded in order to extend knowledge of the species and their conservation needs. This was combined with an educational/mentoring aspect to improve skills in lichenology. The species targeted

were *Lecanora achariana, Umbilicaria spodochroa, Siphula ceratites, Lobothallia melanaspis, Hypogymnia vittata* and a fungus *Tulostoma niveum*.
The group stayed in a holiday let at Scourie, North-West Scotland, looking towards Handa Island, a wildlife reserve with important populations of seabirds. We watched deer out of the kitchen window in the morning and enjoyed the sunsets over the sea at 11PM , which temporarily distracted us from our microscopes. We had two vital pieces of equipment – a large table in the kitchen for the excellent meals that everyone cooked, including Steve's huge bowls of porridge that some people felt needed the addition of peanut butter and chocolate spread (and once even a splash of whisky) and another in the sitting–room for microscopes with a huge wall map of the north of Scotland. The sofas were rarely used, the TV only went on for a rough weather forecast each night (and for the EU referendum result) and we did not miss the lack of wifi or mobile signals. The weather remained almost completely dry, and the midges left us alone, apart from around the front door.

Saturday
Some of us travelled up the west coast of Scotland from the BLS field meeting on the Sleat peninsula (Skye) on a perfect sunny day. On arrival Dr Jean Balfour, who owns the Scourie estate, visited and welcomed us and was interested in the aims of the project. The welcome included a bottle of claret, which was consumed with considerable enthusiasm.

Sunday

John (modelling his new fluorescent cagoule) leaves no stone unturned in his search for lichens…

Sally Ward joined us for the day to learn about saxicolous lichens. Our habitat was the freshwater lochans near Scourie. The main focus was on the splash and amphibious zone and the tops of boulders in and around the lochans (wellingtons essential).We hoped to find *Lecanora achariana*. It was thought that this habitat was suitable although there have been no records this far north and it is considered very rare. *L. achariana* resembles *Lecanora muralis ,* with which it often grows, and also could be confused with *Xanthoparmelia conspersa.* Both of these were found but no *Lecanora achariana.*

We recorded and learned about the following lichens from this habitat (rocks where there is frequent inundation and/or seepage tracks) – *Placynthium flabellosum*, which grows on very damp acid rocks and can frequently be submerged, *Placynthium pannariellum*, *Placynthium tantaleum, Collema glebulentum, Rhizocarpon caesium* and *Rhizocarpon lavatum* which were both found on cobbles within 5–10 cms of the water level, *Ionaspis lacustris* with a parasite *Endococcus verrucisporus* and *Sagediopsis lomnitzensis*, *Verrucaria aethiobola* and *V. anziana*. *Ionaspis lacustris* with cream to orange slightly cracked thallus and deep orange–red-brown apothecia, often with a reddish brown prothallus was found all week whenever we were near lochans with rocks or burns (small lochs and streams). *Porina leptalea*, which lives on both deciduous and coniferous trees as well as damp rocks, was also found.

Placynthium flabellosum, a waterside species with fan-shaped minutely foliose lobes

Sally was introduced to *Umbilicaria cylindrica, U. polyrrhiza*, *U. polyphylla, U. proboscidea* and *U. torrefacta* on nearby siliceous rocks in this montane habitat and also *Pertusaria pseudocorallina* (K+yellow–red), with brown-tipped isidia and *P. corallina* (K+yellow), with longer isidia without brown tips. *Massalongia carnosa* with its small foliose thallus

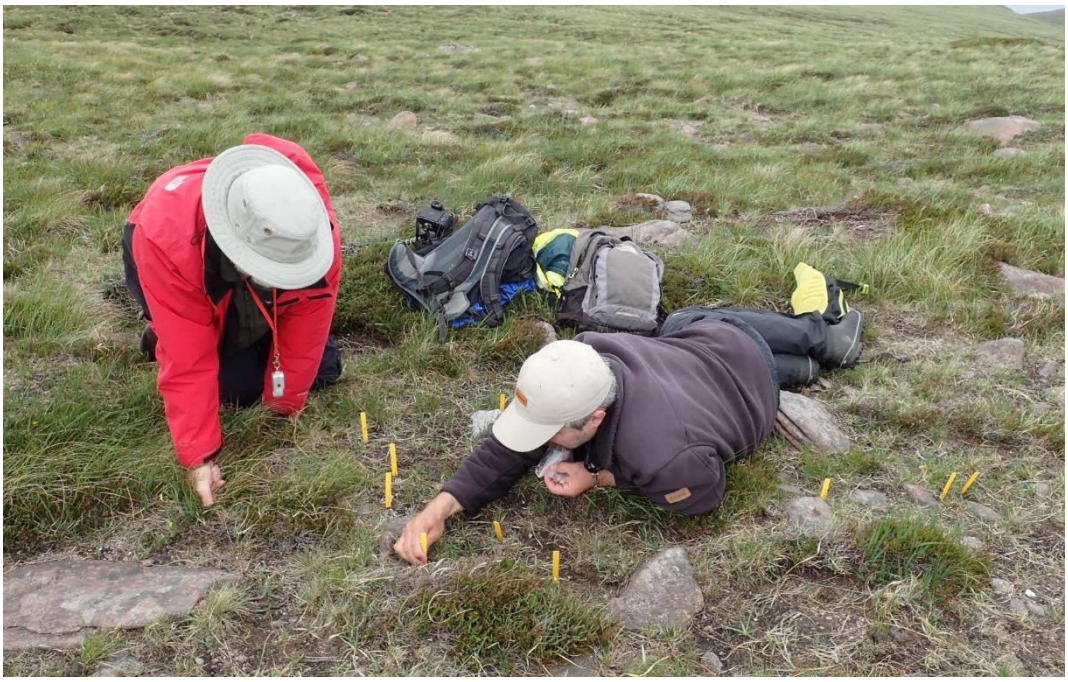
with small matt brown squamules (dark green when wet) was found on acidic boulders and *Stereocaulon vesuvianum* var. *nodulosum* with pseudopodetia with naked upper parts, each terminated by small globose soralium, ended a day of exploring these rocky and wet habitats.

In the evening Heather set out to identify a *Micarea* with an almost non-existent thallus. As midnight approached (although it was still light outside), her first effort to use PD led to a minus result and she realised she had gone wrong. John helped by pointing out that she had not actually applied the PD to the thallus which was so thin. The ID of *Micarea lignaria* followed and as John said, she had chosen a species requiring many of the basic tests – developing her skills.

Monday

We headed for Sheigra north west of Kinlochbervie, near the coast, which was one of the sites where *Siphula ceratites* had been recorded in 1984. We had a one square kilometre grid reference. We spread out and began to search the boggy areas either side of the track, looking in shallow hollows for a chalky-white tufts up to 3 cm high, like a vertical version of *Thamnolia vermicularis. Cladonia* spp*., Pycnothelia papillaria* and *Ochrolechia* spp. were all scanned to no avail. Late in the morning as we got higher, Heather suddenly saw a few very short tufts with a rooting base. All thoughts of lunch

Siphula ceratites growing in a soil pocket, Sheigra



Surveying populations of *Siphula ceratites*, Sheigra

were abandoned as we mapped, and calculated the size and extent of the patches which were often in bare stony ground with a thin layer of peat and associated with *Cladonia* species. The thalli were up to 1.5 cm tall. Steve then found another substantial colony of *Siphula ceratites* on the hill to the east of the track.

John showed us *Cetraria islandica* subsp. *crispiformis* with strongly channelled and incurved lobes, narrower than in *C. islandica* subsp. *islandica. Umbilicaria deusta* with a downward recurved thallus margin added to the *Umbilicaria* records. *Pseudephebe pubescens* formed prostrate mats and *Sphaerophorus fragilis* formed even and compact cushions.

Kristine was due to join us that evening and managed to make contact despite the infrequent mobile reception to say her bus only ran on Thursdays so Paul set off to the train station at Lairg 45 miles away to rescue her.

Tuesday

We went to Loch Eriboll on the North coast to look for *Umbilicaria spodochroa ,* recorded from a single site close to the sea opposite Eilean Dubh in 1974. Again we spread out and there can't have been many seepage tracks in boulders that weren't searched, while we tried to work out what had made Peter James and Oliver Gilbert stop at this point on the A838.We were looking for a single-lobed *Umbilicaria*, with a grey-brown, often whitish upper surface, lower surface mostly dark brown to black, never pink, rough rimose-warted with abundant branched dark brown-black rhizinomorphs and with frequent black apothecia with a thick rim and central protruding 'button' of sterile tissue (see *Lichens of Great Britain and Ireland*). We didn't find it and concluded that the building of a track near the shore for the fish farm may have disturbed the particular boulder it lived on.

We did find the usual suite of *Umbilicarias*, including *U. polyrrhiza* with apothecia, said to be very rarely fertile in the *Lichens of Great Britain and Ireland* and described as '2.5 mm diameter, convex, black with radiating gyri from a central point'. Erect rhizinomorphs were observed on the thallus margins and these also arose from cracks in the surface.

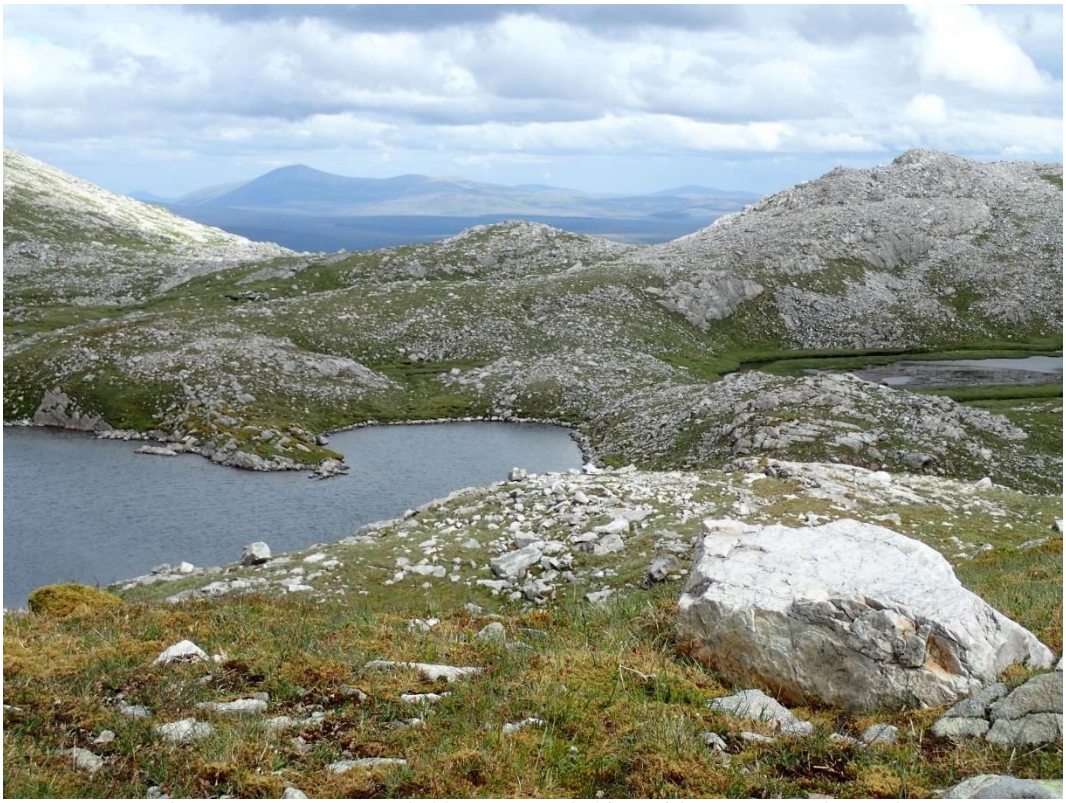
Fertile thallus of *Umbilicaria polyrrhiza*, with its extraordinary gyrose apothecia

Others recorded included *Icmadophila ericetorum* and *Vahliella leucophaea.* John and Kristine walked uphill and recorded the mostly montane species *Alectoria sarmentosa subsp.* vexillifera, *Allantoparmelia alpicola*, *Ochrolechia frigida* forma *frigida*, *Pertusaria dactylina* and *Thamnolia vermicularis*. Heather found bedrock with a good population of *Lasallia pustulata*, but none could be found in similar habitat nearby.

Wednesday

The aim was to refind *Lobothallia melanaspis* (formerly *Aspicilia melanaspis*) in a lochan above Inchnadamph, where it had been recorded in 1958 and 1995 by Oliver Gilbert. We walked up to Loch nan Cuaran where we lunched with wonderful views of mountains. Steve was leaving that day but first he checked the boulders on the perimeter of the loch for *L. melanaspis* but didn't find it. In fact his three-hour circumnavigation of the shoreline revealed but a very depauperate lichen flora. John walked higher past two other lochans before reaching Lagan Mhuirich to be joined later by Paul. Kristine searched Loch Meall nan Caorach. The *Lichens of Great Britain and Ireland* describes *L. melanaspis* as 'the only foliose *Aspicilia* in Britain. The large, loosely attached lobes and sessile apothecia resemble a white form of *Anaptychia runcinata* or a very large *Physcia* sp. It is rare and endangered and is found on siliceous

lakeside rocks near 700 m'. Approximately 120 thalli of *Lobothallia melanaspis* were recorded at Lagan Mhuirich on 8 boulders, but none were found at the other lochs nearby.



Loch nan Cuaran, surrounded by montane habitat with a very complex geology

Heather stayed at Loch nan Cuaran at approx. 600 metres and recorded *Alectoria nigricans, Allantoparmelia alpicola*, *Pseudephebe pubescens* and *Geltingia associata* with large black apothecia covering a white thallus – possibly an *Ochrolechia* – this was loose on a ledge. The limestone valley is a site for *Tulostoma niveum* – a stalkball – previously found on the tops of moss-covered boulders, but it was early in the year for this and no new sites were found here or in other suitable habitat we visited.

Thursday

We set out to search again for *Siphula ceratites*, last recorded looking towards Suilven above the path to Inverkirkaig Falls near Lochinver in 1971, 1980 and 1991. This time we had a grid reference to 100 square metres so had high expectations and were not surprised when Kristine and Heather found the first patch after 5 minutes search. We started to record the size of the patches, but quickly realised that this time it was extensive, growing in soil pockets in grass. At times *Siphula ceratites* grew sparsely; more often it was thick and the soil pockets were heavily populated. Sometimes dead grass was lying on top, sometimes the soil pockets were in rock. The aspect of the gently undulating grassy plateau varied, but *Siphula ceratites* was found in every aspect. Eventually we managed to record it in the next kilometre square to the north.

Lobothallia (*Aspicilia*) *melanaspis* lon lochside boulders at its only known British site

The solid cortex of *Siphula ceratites*, which has thalli with rounded apices, is C+violet–yellow–brown, soon fading, and K+yellow to yellow brown and KC+ yellow–orange to yellow–brown, Pd–, UV ± violet-glaucous or ± yellow. It has been called chalk worms and is also found in Coulin Forest and near Cove, both in Wester Ross. McVean in an article in 1956 considers its occurrence in Scotland and notes it has no mechanism for long range spread, being dispersed by fragmentation. In the USA it has been called waterworms and arctic fingerbones and can apparently stand in water for a long time. It is also found on the coast of Norway. (In contrast *Thamnolia vermicularis* – mountain worms – is hollow and has pointed apices, a prostrate habit and is C–, K+ pale yellow, KC–, Pd +yellow, UV+ white according to *The Lichens of Great Britain and Ireland*).

Other finds included *Amygdalaria pelobotryon* – on low, flushed rocks – the thallus is cracked/areolate, sometimes with nitrogen-fixing cephalodia and sometimes tinged pink and is C+pink. We learned that *Lecidea phaeops* is similar but has a C– thallus. *Epigloea soleiformis* on an algal film on *Stereocaulon vesuvianum* was later determined by Brian Coppins. Most excitingly, Brian has just identified a lichenicolous fungus on the *Siphula* from a historical collection from Inverkirkaig uncovered by Heather as *Sphaerellothecium siphulae*, new to Britain and previously only recorded from the Russian Arctic.

The habitat for *Siphula ceratites*, in moorland with Suilven in the background

Friday

Watercourses occupied us all day, starting with a bridge on the A838 over a burn going into the Kyle of Durness. The burn appeared eutrophic – possibly because of the limestone outcrop further upstream but was found to support species including *Ionaspis lacustris, Rhizocarpon caesium, Staurothele fissa, Verrucaria anziana* and *V. aethiobola* on siliceous rocks and *Staurothele caesia*, *Thelidium papulare* and *Gyalecta jenensis* on a limestone outcrop running across the burn.

Lichens found in the limestone outcrop either side of the burn included *Dermatocarpon miniatum, Solorina saccata, Protoblastenia calva* with deep orange apothecia in shallow pits, *Collema polycarpon* in a rosette-like cushion and very fertile with stalked apothecia, *Collema auriforme* with coarse granular isidia, *Collema multipartitum* with a much-branched thallus, *Gyalecta jenensis* and *Belonia* (now *Gyalecta*) *nidarosiensis* showing the orange photobiont in a large orange-pink sheet on a vertical side of a boulder. Lunch by the road yielded *Stereocaulon delisei* with terminal granular soredia, larger than in *Stereocaulon vesuvianum* var. *nodulosum.*

In the afternoon John was in his element in another burn coming from Loch an Eas Ghairbh near Rhiconich. In the amphibious zone not more than 30 cm above the water level this yielded *Ionaspis lacustris*, *Placynthium flabellosum, Porina guentheri* var. *guentheri, P. guentheri* var. *lucens, P. lectissima, Staurothele fissa*, *Verrucaria aethiobola* and *V. anziana*. We learned that in *Porina* species the whole of the perithecium is usually exposed. In *Verrucaria*s the thallus is usually partly over the perithecia. *Porina* species

generally like shade and some can live under water for some weeks. *Rhizocarpon amphibium* can also live under water or up to 30–40cm above during periods of drought. It is grey, areolate with flat black apothecia in concentric rings. *Rhizocarpon lavatum* was seen again. In wet climates it can live on the top of boulders. It is not specifically a fresh water specialist. *Porpidia hydrophila* also lives on inundated siliceous rocks. It has a blue epithecium which can clearly be seen in section. In the terrestrial zone which can sometimes get inundated there were lichens including *Stereocaulon* species*, Ochrolechia parella, Parmelia sulcata* and *Pertusaria corallina*.

Cornicularia normoerica near the Falls of Kirkaig

John had shared his knowledge of lichens in watercourses but back at base we felt we needed to test his wide knowledge of chocolate spreads. Could he really tell the difference between two well-known brands? He closed his eyes and we gave him 4 teaspoons of chocolate spread. His score was 1 out of 4!

Saturday

We drove two hours across Sutherland to the east coast, to Ferry Links near Golspie to admire *Hypogymnia vittata* in short coastal turf with small pebbles beside a well-frequented track from the nearby car park. The thallus is browner than in *Hypogymnia physodes*, and the apices of most lobes have a large pore on the underside. It is Pd–, whereas *H. physodes* is Pd+ orange to red. So far it has only been recorded in Britain from this site.

Hypogymnia vittata with its brown thallus (right) growing in association with *H. physodes* (right)

Two hours later we were still in the same patch of short turf, looking at *Peltigera leucophlebia, Thamnolia vermicularis, Psoroma hypnorum*, tiny jelly lichens, *Ochrolechia frigida* var. *lapuensis* and nearby *Diploschistes muscorum* on *Cladonia pocillum*. It was surprising to see so many high-montane specialists within a few metres of the sea.

Kristine and Heather then looked briefly at the lichen heath at Cuthill links, noting that despite the recent rain the lichens were dry and brittle and could be easily damaged. We looked at a notice board erected by the Skibo Estate, raising awareness of the lichens and the need to avoid trampling them where the lichen heath borders the golf-course. The soil is a mix of sand and pebbles and there is a very rich cover of lichens including many *Cladonia* species growing among the heather.

This was a fitting end to an excellent and enjoyable, hardworking and good humoured week in which we learned lots and found some of our targets –*Siphula ceratites, Lobothallia melanaspis* and *Hypogymnia vittata*. We didn't find new sites but maybe in the future people going to these areas will continue to look out for all these lichens. Many thanks to Paul and John for leading this week.

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