

LICHEN SPECIALITIES OF LUNDY: AN OVERVIEW

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ABSTRACT

Lundy is an important reservoir of lichens, especially for rare coastal lichens, including *Teloschistes flavicans* and *Anaptychia ciliaris* var. *mamillata*. Survey results of the rich lichen communities on heathland, maritime rock, walls and trees are summarised with reference to conservation management.

Keywords: *lichen, Lundy, Teloschistes, conservation, community*

INTRODUCTION

Lundy is a significant reservoir of lichens, including some rare to the British Isles, and some which provide a Macaronesian element. Unlike in the Channel Islands, where in the nineteenth century there was already lively interest in collecting and identifying lichens, much due to the eminent lichenologist Charles Lorbalestier, lichens on the small islands of south-western England and Wales were largely unrecorded and neglected. Only in recent years has this omission been redressed with surveys, for example, on Skomer (Wolseley *et al.*, 1996), Bardsey (Fletcher, personal communication), Scilly Islands (unpublished surveys, James and Printzen, and British Lichen Society field meeting, 1999) and Lundy (James, Allen and Hilton, 1996, 1997). It is now apparent that islands, relatively undisturbed by man and generally more free than the mainland of atmospheric pollution (to which lichens are sensitive), are important lichen reservoirs (James *et al.*, 2001). Lundy is at the forefront of this recognition.

Lundy went on the lichen map when, near the end of the last century, it was appreciated that it had, apart from possibly the Scilly Islands, the largest colony of *Teloschistes flavicans* (golden hair lichen) in the British Isles (Gilbert, 1995; Gilbert and Purvis, 1996). This striking species is scattered along the windy, exposed west coast anchored to low granite by other lichens (e.g. *Parmotrema perlatum*) or by *Calluna vulgaris*, and on soil by the lichen *Cladonia ciliata* var. *tenuis*. *T. flavicans* has declined dramatically in Britain over the past century due to its sensitivity to air pollution and loss of habitat. It is a Red Data Book endangered species cited as vulnerable (Church *et al.*, 1997) and should not be collected (Figure 1).

The added find by Barbara Hilton of the rare *Anaptychia ciliaris* var. *mamillata* (related to the common coastal lichen *A. runcinata*) on low granite near the North Light, prompted a full survey and study of Lundy's lichen communities by James, Allen and Hilton, resulting in two papers published in 1996 and 1997 (*Lundy Field Society Annual Reports 1995 and 1996*). It is now recognised that Lundy has a diversity of 350 lichen species (Allen, 2007) and, notwithstanding rarities, the island has exceptionally rich

lichen communities (James *et al.*, 1977), especially those of heathland (1) and the maritime (supralittoral) (2) zone. Additional habitats for lichen communities have been occasioned by man's habitation, through buildings, walls (3), cemetery and quarries, and the presence of trees (4), most of which have been planted.

SELECTED SURVEY RESULTS

1) Heathland: The occurrence of a serious fire in 1933 at the North End of Lundy (Langham, 1992) resulted in the burning off of heathland vegetation and laying bare granite domes. This has provided a unique opportunity for the study of the succession of lichen colonisation on the granite and peat, which leads to a fully established heathland, as in the area to the north and west of Pondsbury and in the vicinity of the Earthquake.

At the far North End, the low exposed granite domes of hard siliceous rock resemble a lunar landscape, with patches of thin humus between. A distinct lichen community has developed on the undulating surfaces of these low domes, including *Xanthoparmelia conspersa* in the nutrient-enriched shallow depressions with *Pertusaria pseudocorallina* and *Rinodina atrocinerea* on the depression sides. The rims are characterised by *Ochrolechia parella* and brown species of *Neofuscelia loxodes* and *N. verruculifera*. *Ramalina siliquosa*, and species including *Lecanora rupicola* and *Parmelia saxatilis*, grow on the drier exposed ridges.

In the area near Threequarter Wall granite domes with increased lichen diversity interrupt a more continuous *Calluna-Cladonia* heathland formed on deeper humus. Where water collects at the bases of these domes, peat pans develop which are acidic and nutrient-deficient and suitable for colonisation by *Parmelia omphalodes* with other species, including *P. saxatilis*, *Hypogymnia physodes* and *Sphaerophorus globosus*. These lichens, together with the many *Cladonia* species, help to bind humus and also colonise prostrate stems of *Calluna*. There are as many as 12 different species of *Cladonia* in this heathland including, towards the north-east, *Cladonia strepsilis* (rare in southern Britain) in damper areas.

The final phase in the development of this luxuriant *Calluna*-dominated heathland may be viewed north of Pondsbury. Here, amongst *Calluna* with other heathland phanerogams, and the lichens *Cladonia ciliata* var. *tenuis*, *C. portentosa* and *C. uncialis* on deep humus, are shallow islands of humus. These are covered in a wide variety of *Cladonia* species, with the smallest (e.g. red-fruited *C. floerkeana*) in the centre, surrounded by larger species, including *C. furcata*, *C. gracilis* (rare), *C. portentosa* and *C. squamosa* (rare). Most of these species are very well-developed and fertile with apothecia.

Further to the west, to the north of Punchbowl Valley and near the Earthquake, the lichen flora of the low granite domes has become well-established, with *Parmelia omphalodes* dominating the windswept summits in heathland. Associated with this lichen are, for example, *Anaptychia runcinata*, *Fuscidea cyathoides*, *Hypogymnia physodes*, *Ochrolechia parella*, *Parmelia saxatilis*, *Pertusaria pseudocorallina*, *Porpidia platycarpoides*, *Ramalina siliquosa*, *R. subfarinacea* and *Rinodina atrocinerea*. Many of the smaller *Cladonia* species (e.g. *C. floerkeana*, *C. subcervicornis*) and *Sphaerophorus globosus* are abundant in peat-filled cracks.

Recently, since publication of our surveys, we have refound *Bryoria fuscescens* at the North End (with *Cetraria muricatum* and *Platismatia glauca*). This species, reported by Noon and Hawksworth (1973), is more frequently found on acid-barked trees and is very sensitive to ammonia pollution.



Figure 1: *Teloschistes flavicans*, golden hair lichen, with *Parmotrema perlatum* (grey, lower left) on coastal granite.
(Photo: Ann Allen)

Figure 2: Brazen Ward: maritime lichens on nutrient-enriched granite, *Xanthoria parietina* (yellow-orange), *Caloplaca verruculifera* (yellow), *Lecania aiospila* (grey crustose).
(Photo: Ann Allen)



Mention should be made of the Earthquake itself, an interesting area providing a variety of lichen habitats: vertical rock and heathland, sun and shade, shelter and exposure. It is not surprising to find some more unusual lichens turning up here: *Haematomma ochroleucum* var. *porphyrium* on a large expanse of vertical wall, colonies of fruiting foliose lichens (e.g. *Parmelia saxatilis*) and the recently refound *Pertusaria lactea* (also reported by Noon and Hawksworth in 1973).

2) Maritime (supralittoral): While present all around Lundy, the maritime (supralittoral) rock just above the shore and tides is safely accessible for study only in a few places. Two of the most rewarding and contrasting supralittoral areas are at Brazen Ward at the north-east with its sheltered bay and the North Lighthouse Quay, a north-facing exposed site. Both show good zonation patterns (Allen and Hilton, 1987; Fletcher, 1973a, 1973b, 1975) from the lowest wave-swept littoral fringe of black *Verrucaria maura* zone through the orange *Caloplaca marina* zone (mesic-supralittoral). Above this is the *Xanthoria parietina* yellow-orange zone (submesic-supralittoral) which leads into the uppermost *Ramalina siliquosa* grey zone (xeric-supralittoral). In this last zone is a special community of sheltered dry underhang species (James, 1970), many of which are rare on Lundy and represented by scattered components like *Lecanora praepostera*, *Roccella phycopsis* and *Syncesia myrticola* at their northern limit, as well as *Dirina massiliensis* f. *sorediata* and *Peterjamesia circumscripta*.

Brazen Ward, reached by a path sloping gently downwards through the bracken, is of special interest due to the tongue of salt-sprayed and nutrient-enriched rock projecting into the sea. At the tip of the tongue, above the black *Verrucaria maura*, an orange *Caloplaca marina* zone is also colonised by *Lecanora helicopsis* and *Caloplaca verruculifera*, an indicator of nitrogen-enrichment. The central raised dome of the tongue is dominated by *Xanthoria parietina* and *Lecania aiospila*: this is a striking community influenced by the combination of bird droppings, salt-spray and collected rainwater (Figure 2). Into this community are further thalli of *Caloplaca verruculifera* and islets of *Phaeophyscia orbicularis* and the tiny crustose species *Rinodina orculariopsis*. Another *Caloplaca marina* association landward, further behind the tongue, is unusually rich in species, while in the *Xanthoria* zone still further towards land a horizontal seepage platform, rich in collected nutrients, is covered in *Lecania aiospila*, *Aspicilia leproscens* (fruiting) and *Lecanora poliophaea* (rare on Lundy). Most of the lichens at Brazen Ward thrive in its moderate shelter and are indicators of nutrient-enrichment by birds.

In stark contrast to Brazen Ward, at the North Lighthouse Quay the exposed north-facing rock rises almost vertically from the shore and the supralittoral zones are large (total height of 35 m), due to the extensive reach of the salt spray. Access is by the steps with rusted iron railings, down to the *Verrucaria* platform at the bottom, then by working upwards. The kinds and abundance of species differ from those at Brazen Ward: some lichens colonise the more exposed and sunnier surfaces, while others are found in the shelter and shade of crevices. *Caloplaca microthallina*, *C. thallincola* and *Lichina confinis* are common in the *Caloplaca marina* belt with a little *Lecania aiospila* and *Lecanora poliophaea* in damp nutrient-enriched niches. Further up, in the *Xanthoria* and *Ramalina* zones, vertical surfaces become quite dry; damper, sheltered microhabitats support such species

as *Toninia aromatica*, *T. mesoidea*, *Solenopsora vulturiensis* and the rare *Caloplaca britannica*, with *C. littorea* in small dry underhangs.

The eastern side of the island with its bracken-covered flanks and greater shelter is more hospitable to foliose lichens like the rare *Hypotrachyna endochlora*, an oceanic species, at Tibbett's Point and abundance of *Rinodina beccariana* in sheltered, shaded underhangs. The west side, with its towering cliffs covered in swards of *Ramalina siliquosa* provides, of course, the windswept niches for *Teloschistes flavicans*.

Slate, like granite, is a siliceous rock, but it has a very different texture and water retention. It is confined to the south-east of the island (Langham, 1994), unstable and fragmented in much of the landing area, but able to support a more permanent lichen community below the Castle. Some lichens are more common on slate than Lundy granite and include: *Acarospora smaragdula*, *Buellia saxorum* (rare), *Caloplaca ceracea*, *Diploschistes caesioplumbeus*, *Lecania atrynoides*, *Lecidella asema*, *L. scabra*, *Rhizocarpon geographicum* and *Rinodina confragosa*.

3) Buildings (some derelict) and walls which contain concrete, cement or mortar provide calcareous substrata suited to the colonisation of other lichens which are essentially calcicolous species. These (45 in all) add to the diversity of lichens on Lundy; most are typical for these habitats, especially in urbanised lowland Britain. A few are more unusual, for example, *Chromatochlamys muscorum*, *Bacidia bagliettoana* and *Polyblastia gelatinosa* on calcareous wall tops with soil and moss. Some of the calcicolous lichens are tolerant of high levels of nitrification and eutrophication from man-made sources.

Of particular importance are the dry stone granite walls, especially Quarter Wall (pre-eighteenth century and of earth-stone construction on the west), Halfway Wall (1752) and Threequarter Wall (1872). These walls provide contrasting northern and southern aspects and can be dated (Thackray, 1989), enabling comparisons. The lichens on the granite are, for the most part, the same as those on the coastal rock, but a few species appear more commonly on the walls or, as rare species, are found exclusively on the walls. These include *Buellia aethalea*, *B. stellulata* (rare), *Fuscidea lygaea* (rare), *Lecania hutchinsiae* (on shaded, damp vertical slate, locally abundant under roadside *Acer*), *Lecanora fugiens*, *Lecidea diducens* (rare), *Sarcogyne privigna* (rare), *Ramalina canariensis* and *R. lacera*. Wall construction may provide the appropriate protection for some of these species which are essentially halophobic and unable to survive elsewhere on Lundy. The commonest *Usnea* species on Lundy, *U. flammea*, is found on these exposed windswept walls, as well as on bluffs and trees. *Usnea* species are notoriously sensitive to sulphur dioxide air pollution and are scarce in many parts of mainland Britain.

From a comparative study of these walls we conclude: the greatest percentage cover of lichens occurs on the oldest wall, Quarter Wall, on both aspects. Halfway Wall and Threequarter Wall have much the same cover on their south faces (80% and 70% respectively). The cover on the north faces of Halfway Wall and Threequarter Wall is significantly lower for both (35% and 40% respectively). Species diversity is greatest on Halfway Wall with 50 species.

Lichen species on the north-facing and south-facing aspects of the walls are different, with a predominance of slow-growing powdery and sorediate crustose species on the north-facing aspects and fertile species on the sunnier south-facing aspects. Foliose

species are found mostly on the south-facing aspects near the shelter of wall bases with *Ramalina siliquosa* and *Usnea flammea* often on the exposed tops. For all three walls, the dominant species on the south-facing aspects are *Pertusaria pseudocorallina* and *Ramalina siliquosa*, a duo frequent on the cliffs although, nearer the sea on sunny outcrops, *Buellia subdisciformis* replaces much of the *Pertusaria pseudocorallina*. Other crustose and some foliose species (e.g. *Parmelia saxatilis*, *P. sulcata*) enter this community. On the north-facing aspect, except for Quarter Wall where *Pertusaria pseudocorallina* continues to dominate, there are no dominant species, but *Cliostomum tenerum*, *Haematomma ochroleucum* var. *porphyrium*, *Lecanora expallens* and *Lepraria* species are common.

4) Trees are not numerous on Lundy. Most have been planted in the relative shelter of the Millcombe Valley and quarries but still are subjected to wind exposure and blasts of salt spray. Many trees, nearing the end of their lives, are in a moribund condition. It is therefore surprising to have found 120 different corticolous lichen taxa, *Acer* with 56 having the most, with *Quercus* and *Salix* runners-up. The diversity of species reflects the diversity of tree species, the bark pH and texture, and each lichen's requirements for aspect, illumination, exposure and moisture. While crustose species such as *Lecanora confusa* and *L. expallens*, and foliose lichens such as *Evernia prunastri*, *Parmelia sulcata* and *Parmotrema perlatum* are common, a few species are more unusual, or becoming less widespread, in mainland Britain, including *Caloplaca cerina* and *Lecanora sambuci* (due to air pollution), and *Ramalina portuensis* and *Rinodina biloculata*.

However, the corticolous diversity is misleading as many species appear as single records, not because they are rare in Britain but because they are rare on Lundy and often confined to one tree. This makes them very vulnerable. If, for example, a single *Quercus* near Millcombe dies or is cut down, we lose the records for *Arthonia arthonioides* and *Usnea rubicunda*. If we lose aging *Salix* in the quarries we lose *Lecanora jamesii* and *Usnea subfloridana*. These are only a few of the examples, a frightening, but nevertheless real, scenario. While a few common lichens may persist as epiphytes, Lundy's specialities will be lost.

CONCLUSION

Lundy has a diversity of 350 lichen species, almost one-fifth of the total for the British Isles (Coppins, 2002), nearly all of which are described in *The Lichen Flora of Great Britain and Ireland* (Purvis *et al.*, 1992), and many of which are illustrated in *Lichens. An Illustrated Guide to the British and Irish Species* (Dobson, 2005). Lichen habitats on Lundy are shown in Figure 3.

Lundy stands out as an important area for lichen conservation. It is a reservoir especially of rare coastal lichens such as *Teloschistes flavicans* and has outstanding examples of heathland and maritime lichen communities. The successful future of lichens depends on careful management, especially north of Quarter Wall, including: avoidance of heavy trampling and over-grazing, to which heathland is particularly vulnerable:

- sensitive repair to dry stone walls, with avoidance of the introduction of cement, and replacing stones in their original position and orientation;
- replanting of suitably selected trees and their subsequent maintenance to redress the accelerating loss of habitat for corticolous lichen species;

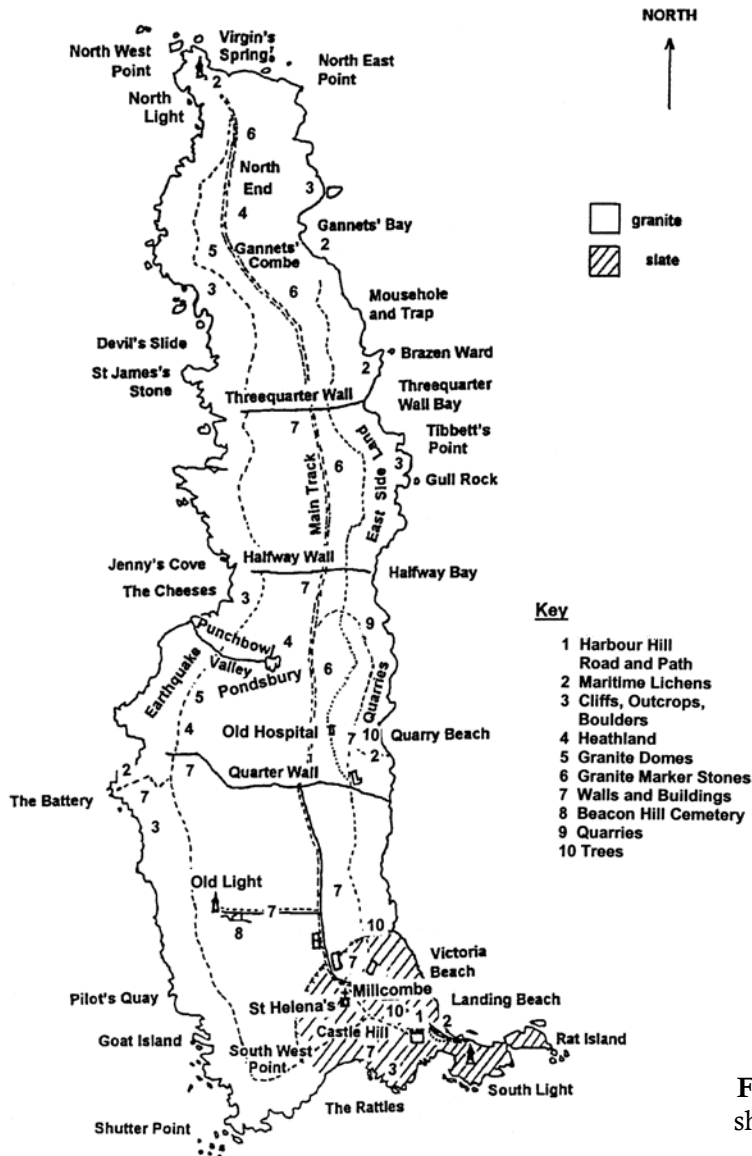


Figure 3: Lundy map showing lichen habitats

- avoidance of application of artificial fertilisers or spread of natural organic fertiliser; these practices could lead to eutrophication and subsequent loss of lichen species. Rich and diverse lichen communities, as on trees, could then be replaced by species-poor lichen communities dependent upon high levels of environmental nitrogen.

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