Cyfoeth Naturiol Cymru
Natural Resources Wales

Lichen survey of Baron Hill Park SSSI

D. M. Lamacraft

Evidence Report No 733

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Contents

List of Figures

Crynodeb Gweithredol

Cafodd Dave Lamacraft ei gontractio gan Cyfoeth Naturiol Cymru i gynnal arolwg o gennau SoDdGA Parc Baron Hill ger Biwmares, Ynys Môn. Canolbwyntiwyd ar dacsonau epiffytig nodedig a fyddai'n berthnasol o ran diddordeb SoDdGA, ac ar y tacsonau sy'n cael eu crybwyll yn nogfen ddiffiniol y SoDdGA.

Cynhaliwyd yr arolwg dros ddau ddiwrnod ym mis Gorffennaf a mis Awst 2023. Gwnaed 246 o gofnodion o 97 o dacsonau o gennau a ffyngau sy'n byw ar gennau. Ystyrir bod 16 o'r rhain yn nodedig, gan gynnwys:

- *Bacidia biatorina* Cymru NT, newydd i VC52
- *Lecanora horiza* GB NT, Cymru VU, NS
- *Pachyphiale carneola* Cymru NT
- *Ramalina fraxinea* IR
- *Rinodina griseosoralifera* NS
- *Schismatomma ricasoli* GB VU, Cymru VU, S7, NS, IR
- *Thelopsis rubella* Cymru NT, NS

Mae lefelau'r poblogaethau o dacsonau nodedig yn isel ar y cyfan.

Casglwyd cofnodion hanesyddol, o adroddiadau arolygon blaenorol ac o gronfa ddata Cymdeithas Cennau Prydain. Mae 143 o dacsonau o gennau a ffyngau sy'n byw ar gennau wedi'u cofnodi yn SoDdGA Parc Baron Hill ers dechrau'r 1970au. Mae'r rhain yn cynnwys 4 tacsa nodedig nas cofnodwyd ers hynny, gan gynnwys:

- *Caloplaca luteoalba* GB EN, Cymru CR, NS
- *Stigmidium congestum* NS

Nid yw'n ymddangos bod Parc Baron Hill yn cyrraedd y trothwyon cymhwyso i fod yn SoDdGA mewn perthynas â chennau ar hyn o bryd. Serch hynny, mae SoDdGA Parc Baron Hill yn cynnal rhai rhywogaethau pwysig o hyd, e.e. *Schismatomma ricasoli*, a ddarganfuwyd ar y safle am y tro cyntaf yn 2023, a *Lecanora horiza*, sy'n newydd i VC52, ynghyd â rhai rhywogaethau cefnforol diddorol mewn treigl dŵr basig ar hen dderwen gysgodol (*Bacidia biatorina*, *Pachyphiale carneola*, *Thelopsis rubella*).

Mae'n ymddangos bod y safle wedi cadw llawer o'r diddordeb mewn perthynas â chennau ers 1996, a hyd yn oed ers yr 1970au (o ran y rhestr o rywogaethau). Y brif golled fu *Caloplaca luteoalba*, sydd wedi dirywio'n sylweddol ar hyd a lled Prydain ar ôl colli coed llwyfenni yn sgil clefyd llwyfen yr Iseldiroedd, ac mae'n debyg mai dyma oedd yn gyfrifol am ei dranc yma. Mae yna gynefinoedd addas posib o hyd ar ffurf rhisgl a phren masarn (a nodwyd o leiaf un llwyfen ifanc). Y prif fygythiadau a phroblemau rheoli o ran y diddordeb mewn perthynas â chennau yw:

- Argaeledd coed aeddfed a hynafol yn y dyfodol
- Rheoli pori
- Llygredd aer
- Rheoli pren wedi cwympo sy'n pydru

Executive summary

Dave Lamacraft was contracted by Natural Resources Wales to undertake a lichen survey of Baron Hill Park SSSI near Beaumaris, Ynys Môn. The focus was on notable epiphytic taxa which would be relevant to SSSI interest, and on taxa mentioned in the SSSI citation.

Survey took place over two days in July and August 2023. 246 records were made of 97 taxa of lichens and lichenicolous fungi. 16 of these are considered notable including:

- *Bacidia biatorina* Wales NT, new to VC52
- *Lecanora horiza* GB NT, Wales VU, NS
- *Pachyphiale carneola* Wales NT
- *Ramalina fraxinea* IR
- *Rinodina griseosoralifera* NS
- *Schismatomma ricasoli* GB VU, Wales VU, S7, NS, IR
- *Thelopsis rubella* Wales NT, NS

Populations of notable taxa are mostly at low levels.

Historic records, from previous survey reports and from the British Lichen Society database, were collated. 143 taxa of lichens and lichenicolous fungi have been recorded at Baron Hill Park SSSI since the early 1970s, these include 4 notable taxa not recorded since, including:

- *Caloplaca luteoalba* GB EN, Wales CR, NS
- *Stigmidium congestum* NS

Baron Hill Park does not appear to meet SSSI qualifying thresholds for lichens currently. Despite this, Baron Hill Park SSSI continues to support some important species e.g. *Schismatomma ricasoli*, found new to the site in 2023, and *Lecanora horiza*, new to VC52, and the interesting occurrence of some oceanic species in a base-rich flush on a sheltered old oak (*Bacidia biatorina, Pachyphiale carneola, Thelopsis rubella*).

The site seems to have retained much of its lichen interest since 1996, and even since the 1970s (in terms of the species list). The main loss has been *Caloplaca luteoalba*, which has undergone significant declines across Great Britain with the loss of elms to Dutch elm disease, and this has probably caused its loss here. Potentially suitable habitat remains in the form of sycamore bark and wood (and at least one young elm was noted). The main threats and management issues to the lichen interest are:

- The availability of future mature and veteran trees
- Pasture management
- Air pollution
- Fallen decaying wood management

1. Introduction

Dave Lamacraft was contracted by Natural Resources Wales (NRW) to undertake a lichen survey of Baron Hill Park SSSI near Biwmaris (Beaumaris), Ynys Môn.

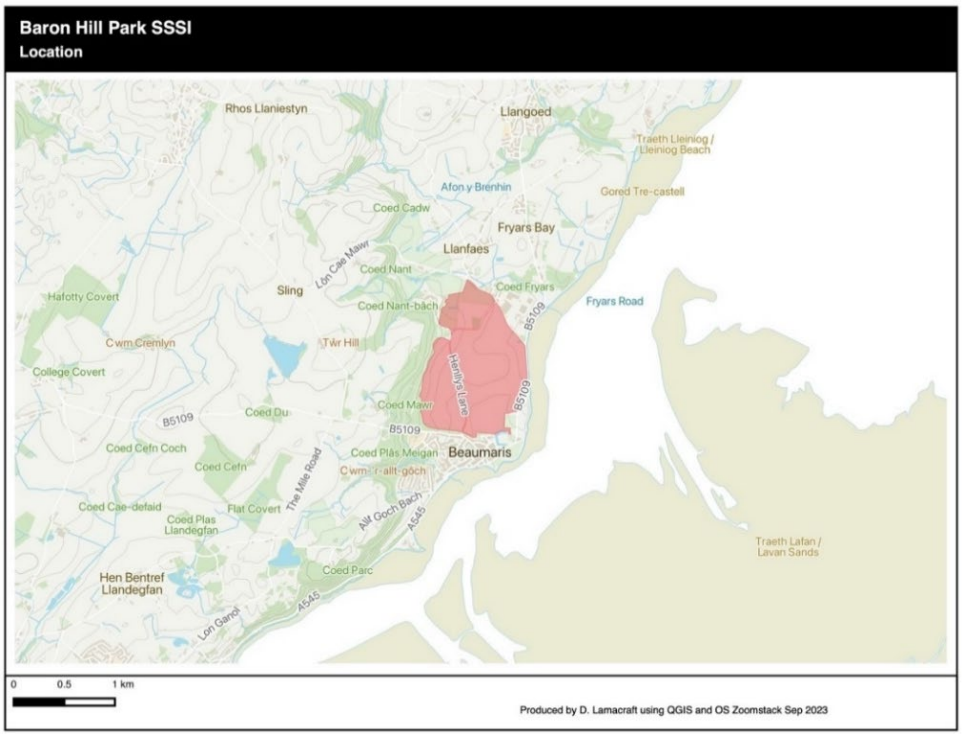
2. Scope of the project

A survey of the lichens of Baron Hill Park SSSI to assess the current lichen assemblage, population size and any trends since previous surveys, and to evaluate the interest against current SSSI selection criteria (Sanderson et al 2018).

3. Background

Baron Hill Park SSSI was notified in 1980, primarily for its lichens, and was renotified in 1985. The SSSI citation for the 112 ha site says it is “a parkland containing ancient trees which support a diverse and interesting epiphytic lichen flora. A total of 118 lichen species have been recorded from all substrata in the Park. The epiphytic lichen flora includes a continental element with the species typical of low rainfall and high sunshine areas more commonly found in southern England. It contrasts markedly with the lichen floras of North Wales woods. Lichen species of particular note include *Parmelia* (*Flavoparmelia*) *soredians*, *Arthonia impolita* (*Pachnolepia pruinata*), *Caloplaca luteoalba*, *Parmelia reticulata* (*Parmotrema reticulatum* s. lat.), *Rinodina roboris* and *Schismatomma* (*Dendrographa*) *decolorans*. *Anaptychia fusca* (*runcinata*), which normally grows on maritime rocks, is found here on the bark of an oak tree.” At the time, there were no bespoke SSSI selection guidelines for lichens – these were first written in 1993 and revised in 2018 – so ‘expert judgement’ was used to select nationally important sites for lichens as SSSIs.

Figure 1. Baron Hill Park SSSI location



4. Method

A 10x Lichen Candelaris hand lens was used to search for and identify lichens in the field, focussing on epiphytic species and especially on those mentioned in the SSSI citation or otherwise notable. Recording was made using an iPhone SE, which was also used for taking photos. GPS readings were made using a Garmin GPSMAP 64s.

Every effort was made to identify lichens in the field, limiting the need for collection for later confirmation in the laboratory. The chemicals commonly used by lichenologists in the field – potassium hydroxide (KOH), and sodium hypochlorite (NaClO), in this case Milton Sterilising Fluid – were used for chemical tests to aid in field identification. Some specimens were collected for later microscopic confirmation with a Meiji 20-40x stereo microscope and a Leica compound microscope.

Records of notable species were mapped using QGIS and input into the standard British Lichen Society recording spreadsheet.

The concept of individual equivalents (Bergamini et al 2019) is applied here as a means to assess population size.

Historical records were collated from previous survey reports and from the British Lichen Society database.

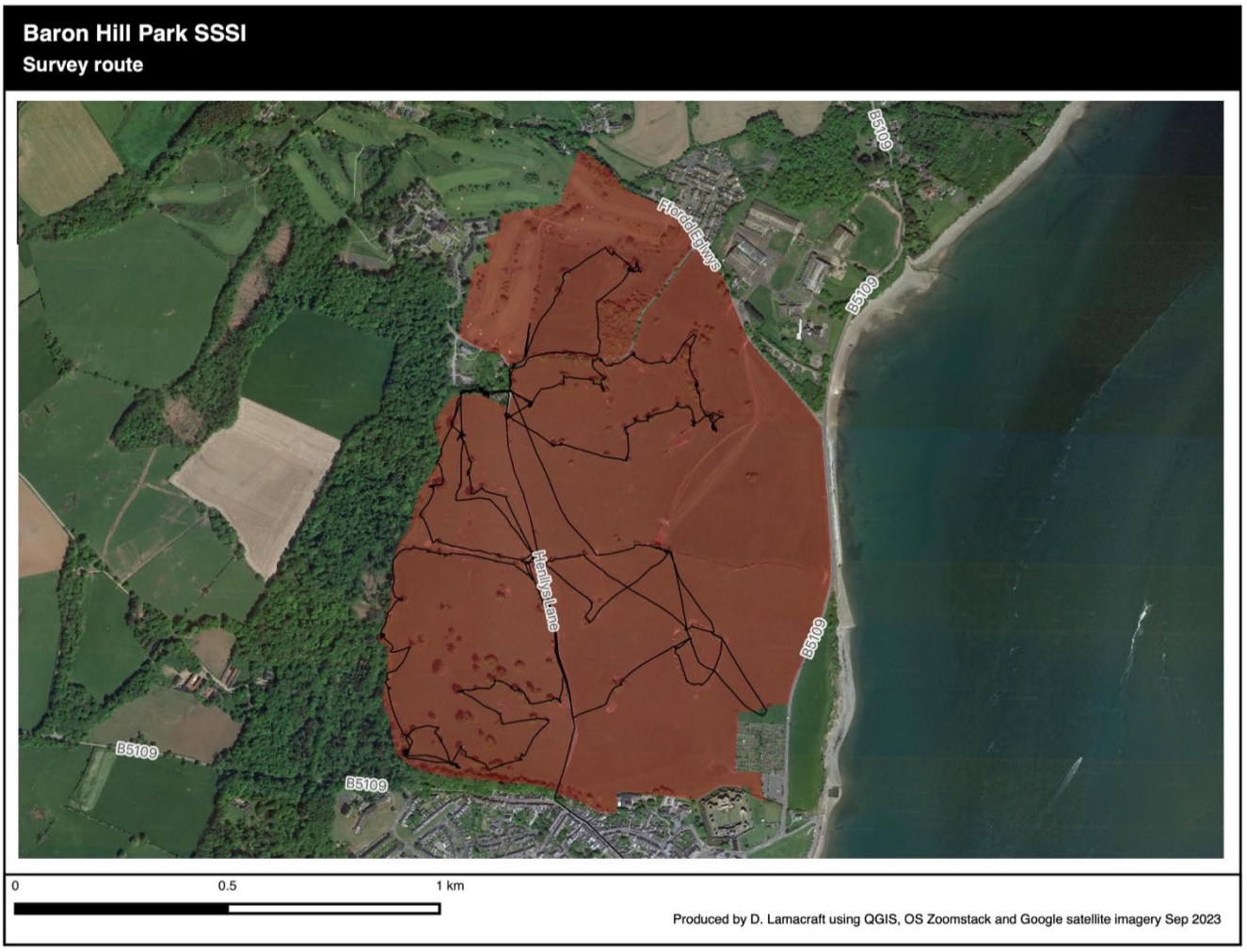
5. Synonyms

Recent name changes for species recorded are listed below. The current names – per British Lichen Society Taxon Dictionary – are used in the report.

Old name	**New name**
Bacidia delicata	*Bacidina delicata*
Schismatomma decolorans	*Dendrographa decolorans*
Dimerella pineti	*Coenogonium pineti*
Leptogium teretiusculum	*Scytinium teretiusculum*
Lecanora dispersa	*Myriolecis dispersa*
Opegrapha atra	*Arthonia atra*
Opegrapha herbarum	*Alyxoria culmigena*
Opegrapha sorediifera	*Zwackhia sorediifera*

Opegrapha varia	*Alyxoria varia*
Arthonia pruinata	*Pachnolepia pruinata*
Pertusaria albescens* var*. albescens	*Lepra albescens* var*. albescens*
Pertusaria albescens* var*. corallina	*Lepra albescens* var*. corallina*
Pertusaria amara* f*. amara	*Lepra amara*
Schismatomma graphidioides	*Schismatomma ricasoli*
Pertusaria hemisphaerica	*Varicellaria hemisphaerica*

Figure 2. Survey route; Baron Hill SSSI



6. Results

246 records were made of 98 taxa of lichens and lichenicolous fungi in the 2023 survey (see Appendix 1). 16 of these are considered 'notable' because they are either included in the GB or Welsh Red Lists, or are Nationally Rare or Scarce, or are included in assemblages mentioned in the SSSI Guidelines (Sanderson et al. 2018). The notable species are:

Taxon name	Status
Anisomeridium robustum	Wales NT, NS, TNTN Field Trees
Bacidia biatorina NEW VC	Wales NT, SOWI
Dactylospora parasitica	NS
Lecanora argentata	NS
Lecanora horiza	GB NR, Wales VU, NS
Lecanora hybocarpa	NR
Pachyphiale carneola	NT, SOWI
Porina borreri	NS, TNTN Field Trees
Porina byssophila	GB DD, Wales VU, NR
Ramalina fraxinea	IR, TNTN Field Trees
Rinodina griseosoralifera	NS
Rinodina roboris var. *roboris*	IR, TNTN Field Trees
Schismatomma ricasoli	GB VU, Wales VU, S7, NS, IR, TNTN Field Trees score 4
Scytinium teretiusculum	SOWI
Sphinctrina turbinata	NS, TNTN Field Trees
Thelopsis rubella	Wales NT, NS, SOWI

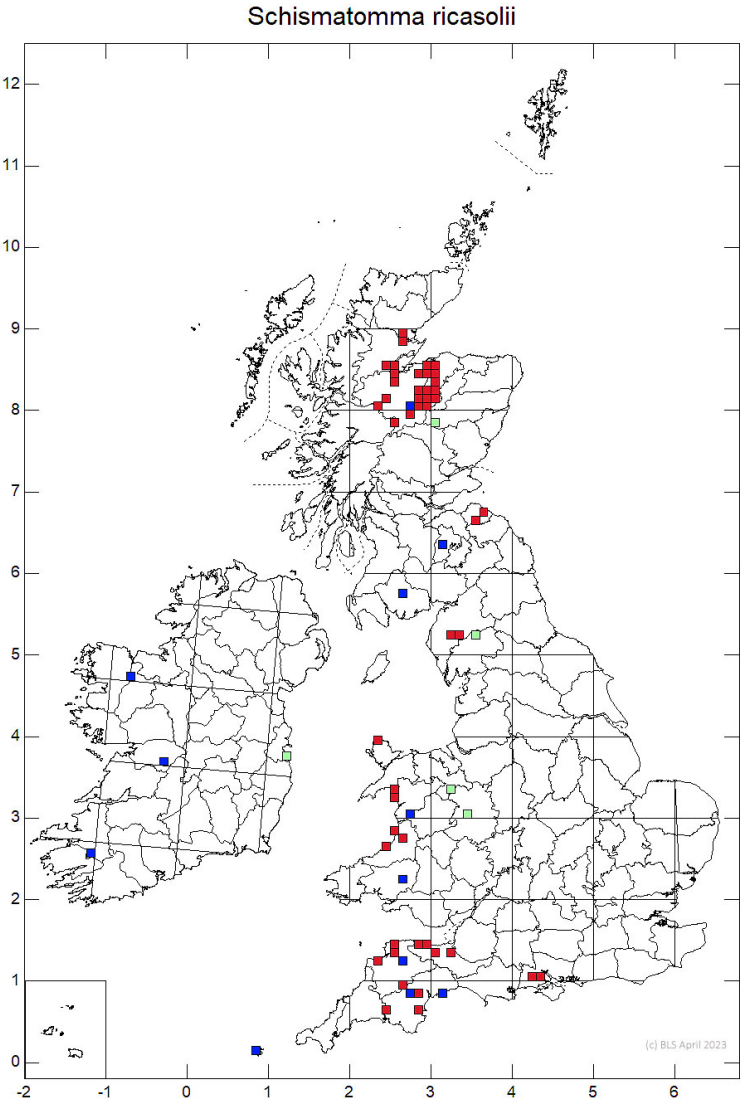
Key
VU: listed as Vulnerable on GB/Wales Red List
NT: listed as Near Threatened on GB/Wales Red List
DD: listed as Data Deficient on GB/Wales Red List
S7 = listed on Section 7 Wales Environment Act ('principal biodiversity species')
NR/NS: Nationally Rare/Nationally Scarce
IR: International Responsibility species
TNTN: Score on 'Threatened, Near Threatened and Notable' list, composed of Red List species and those Nationally Rare & Scare species which are not under-recorded (Sanderson et al 2018)
Field trees: the TNTN Field Trees assemblage of Sanderson et al (2018)
SOWI: the Southern Oceanic Woodland Index assemblage of Sanderson et al (2018)

Summaries for the three GB Red Listed species are below:

Schismatomma ricasoli (GB VU, Wales VU, Section 7, NS, IR, TNTN Field trees)

A crustose species with lirrelate apothecia, similar in appearance to species of *Opegrapha*, most notably *Pseudoschismatomma* (*Opegrapha*) *rufescens* (see https://wales-lichens.org.uk/species-account/schismatomma-graphidioides). It is an epiphyte of mostly old mature trees with naturally nutrient-rich slightly basic-bark, although it is also known from smooth bark in Wales. It is a species of semi-open wooded situations, most commonly found at woodland-parkland interfaces, in sheltered glades, wood-pasture and at woodland edges. It is essentially a wood-edge species (Chambers 2023). It seems to be more widespread than previously thought (see Figure 3 which shows a high proportion of post 2000 records) but is still rare. At Baron Hill Park SSSI it was found on the smooth bark of a relatively young beech (BH20), and was confirmed microscopically. The second record for VC52, the other from the smooth bark of a sycamore at Mynydd y Wylfa recorded by S. P. Chambers in 2012.

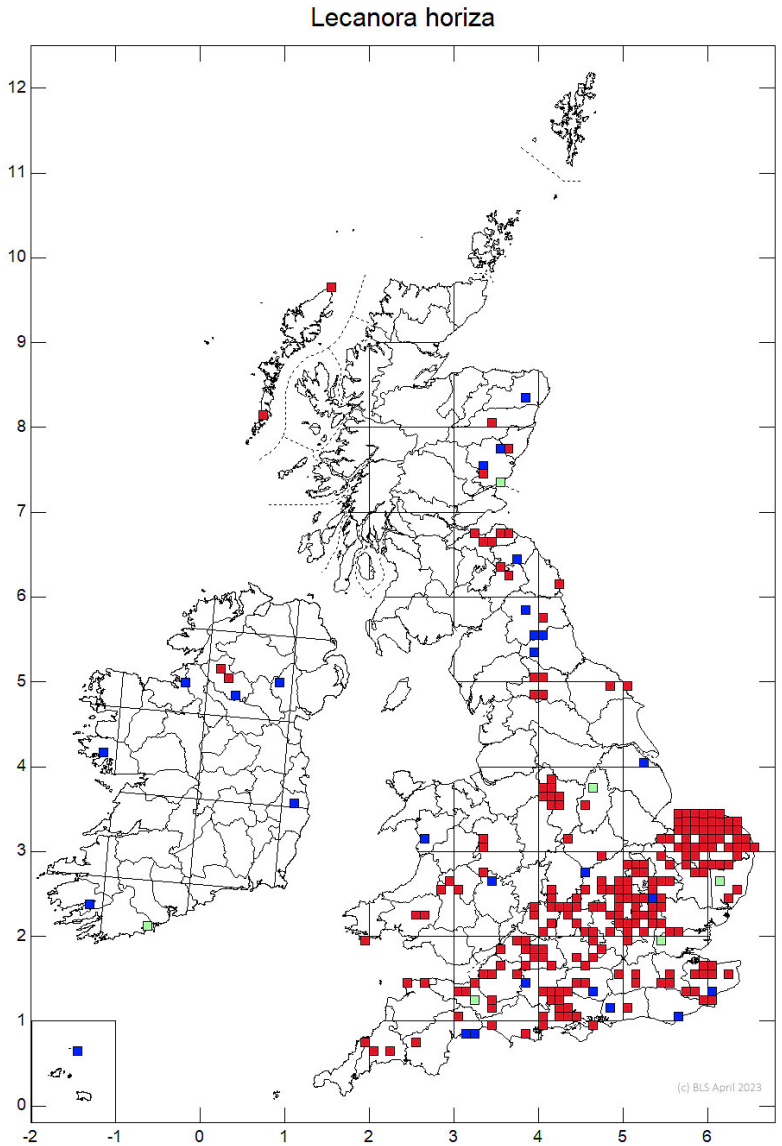
Figure 3. Distribution of *Schismatomma ricasoli* in Britain and Ireland (BLS, 2023). Red: post 2000 record / blue: 1960-1999 / green: 1650-1959



Lecanora horiza (GB NT, Wales VU, NS)

Close to *Lecanora chlarotera* and others of that group, it is considered to have been much overlooked e.g. '*L. horiza* has been much overlooked by British lichenologists and its status will almost certainly be downgraded with the next review of British lichens' (Malter & Powell 2016). It is found on the bark of deciduous trees, especially those with less acidic bark e.g. ash, elm, sycamore. At Baron Hill Park SSSI it was recorded on an old ash (BH1). These appear to be the first records for VC52, and the first post-2000 record for N. Wales.

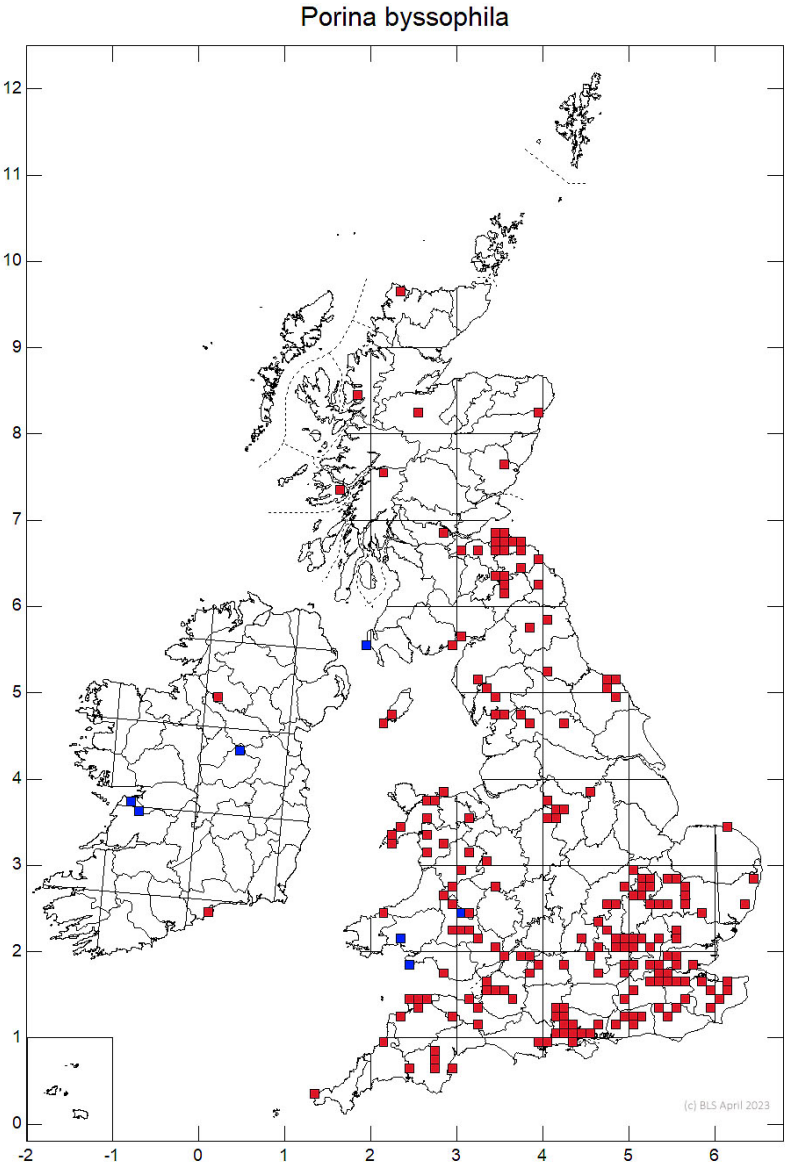
Figure 4. Distribution of *Lecanora horiza* in Britain and Ireland (BLS, 2023). Red: post 2000 record / blue: 1960-1999 / green: 1650-1959



Porina byssophila (GB DD, Wales VU, NR, TNTN)

A crustose species with perithecia of smooth, often less-acidic, bark and rock. Generally considered under-recorded in GB and Ireland, as evidenced by the number of new records in the BLS distribution map (see Figure 5).

Figure 5. Distribution of *Porina byssophila* in Britain and Ireland (BLS, 2023). Red: post 2000 record / blue: 1960-1999 / green: 1650-1959



7. Discussion

7.1 Survey coverage

The survey route is shown in Figure 2. Survey coverage replicated that of Orange (1996) and was comprehensive in the better areas of the SSSI – fields 1,2 and 3 (see Figure 6). Field 6 was also surveyed. The golf course area to the north-west was not surveyed. This was looked at from over the boundary and assessed as likely having limited interest due to shading impacts on the trunks of old trees, and the reduced lichen interest in Field 6 which was considered likely to continue into the golf course area. A decision was made that time was better spent in searching for 'missing' notable species, especially *Caloplaca luteoalba*.

Figure 6 Map of survey areas from Orange (1996) with Field 6 added.

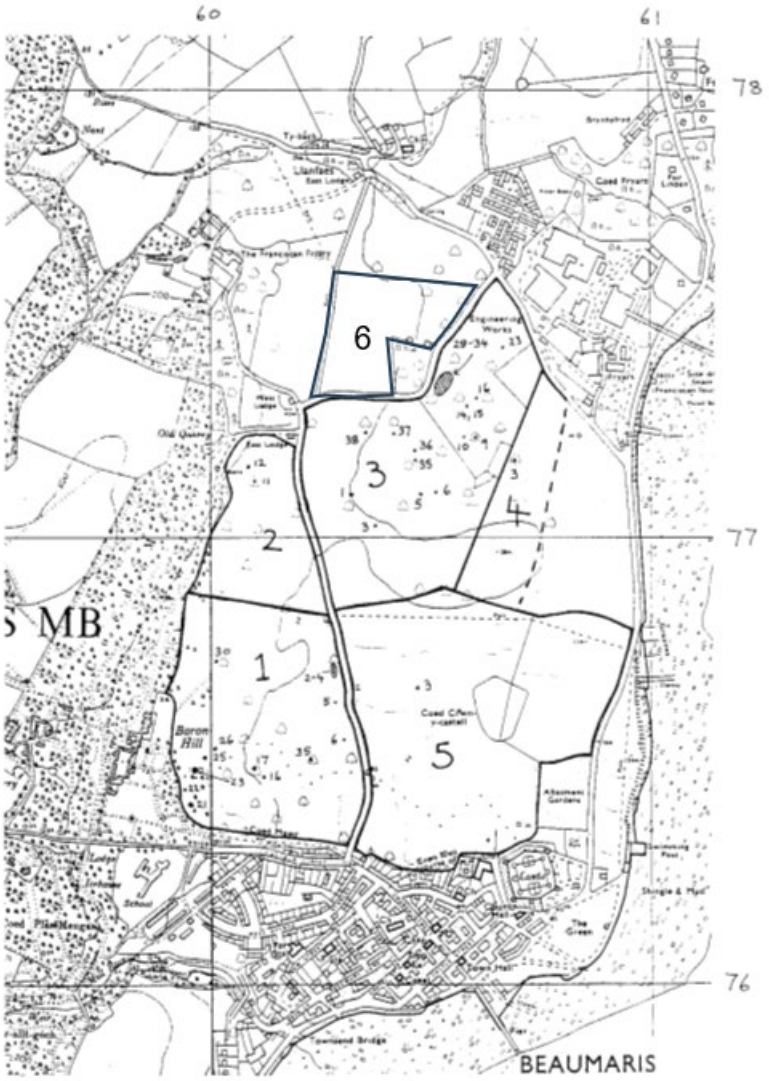


FIG. 21. Baron Hill (Site 21), showing areas surveyed, and position of trees mentioned in text.

7.2 Historic records

Baron Hill Park SSSI has had contracted lichen surveys on two previous occasions: in 1996 by Alan Orange as part of a survey of the lichens of Welsh parklands (Orange 1996) and again in 2003 by William Purvis and Peter James (Purvis & James 2004). In addition, the parkland had been visited by lichenologists in the early 1970s, notably Brian Coppins, Francis Rose, Tony Fletcher and Allan Pentecost. The SSSI is therefore relatively well recorded, although earlier records are poorly localised.

143 taxa of lichens and lichenicolous fungi have been recorded at Baron Hill Park since 1970. The records from these previous visits have been summarised alongside those from the 2023 survey in Appendix 1. With the pre-1996 records, only those records that were able to be assigned to the Park with a reasonable degree of confidence were included e.g. 1970s records for *Collema subflaccidum* and *Sticta limbata* were not included as Orange commented these may have been from the woodland rather than the Park (although it is entirely possible they were recorded from the Park), and 1798 records for *Pannaria rubiginosa* and *Pectenia plumbea* were omitted as they were imprecise 'Beaumaris area'.

7.3 Importance of the lichen flora

There is no doubt that Baron Hill Park SSSI supports an interesting assemblage of lichens of old well-lit i.e. parkland trees, and certainly seems of local interest. At the time of its notification as a SSSI in the 1980s there were no specific criteria for selecting sites for lichens: they were chosen based on 'expert judgement' and the experts at the time considered the site highly unusual and of scientific interest.

20 notable species (as defined currently) have been recorded at Baron Hill Park SSSI since 1970 (Appendix 2), 16 of which were recorded in 2023. Interestingly the 2023 survey recorded notable taxa (and other taxa) not recorded since 1996 or before e.g. *Scytinium teretiusculum*. The 2023 survey also recorded some notable species not previously recorded on the site e.g. *Bacidia biatorina*, *Schismatomma ricasoli*. Notable species not recorded in 2023 are *Caloplaca luteoalba*, *Lecanora jamesii*, *Phaeographis dendritica* and *Stigmidium congestum.*

Using the current SSSI selection criteria for lichens (Sanderson et al 2016) Baron Hill Park SSSI does not qualify under any criteria.

- It would have qualified for its population of *Caloplaca luteoalba* (e.g. criteria 3.3.1 and 3.3.2), but this species appears likely to be extinct on the site.

- In terms of assemblages of species, the most relevant is the TNTN (Threatened, Near Threatened & Notable) 'Old trees of open places' assemblage (Sanderson et al 2018): Baron Hill Park SSSI scores 9 on the 'old trees' assemblage using post-2000 records, falling short of the threshold of 16. Using all records (in effect just adding *Caloplaca luteoalba*) the score would rise to 13, still falling short.

- The Southern Oceanic Woodland Index (SOWI) may also be considered relevant, some elements of the lichen interest having crossover with this assemblage e.g. *Bacidia biatorina, Pachyphiale carneola* and *Thelopsis rubella*. Baron Hill Park SSSI scores 6 on the SOWI assemblage using post-2000 records, falling short of the threshold of 20 for this region.

In some respects, Baron Hill Park SSSI falls somewhere between the two assemblages, being an old tree parkland site with southern oceanic elements, the SOWI taxa are not replicated on the 'old tree' assemblage. However, other significant parklands such as Gregynog and Dinefwr do score well using the SOWI index.

The majority of the notable species are present at low population levels (Appendix 3), although *Rinodina roboris* var. *roboris* is an exception, present on the majority of older oak trees surveyed.

7.4 Comparison with SSSI citation

The SSSI citation states Baron Hill Park SSSI is "a parkland containing ancient trees which support a diverse and interesting epiphytic lichen flora. A total of 118 lichen species have been recorded from all substrata in the Park. The epiphytic lichen flora includes a continental element with the species typical of low rainfall and high sunshine areas more commonly found in southern England. It contrasts markedly with the lichen floras of North Wales woods. Lichen species of particular note include *Parmelia* (*Flavoparmelia*) *soredians*, *Arthonia impolita* (*Pachnolepia pruinata*), *Caloplaca luteoalba*, *Parmelia reticulata* (*Parmotrema reticulatum* s. lat.), *Rinodina roboris* and *Schismatomma* (*Dendrographa*) *decolorans*. *Anaptychia fusca* (*runcinata*), which normally grows on maritime rocks, is found here on the bark of an oak tree."

The situation in 2023 is similar, if not better in some respects. The total species recorded has grown to 143 (including lichenicolous fungi), recorded from epiphytic substrates only. It still contains that 'lowland' element to the lichen interest, typical of drier sunnier areas, which does contrast with many North Wales woods. However, it does seem quite typical of the drier, sunnier, lowland areas of the region e.g. Llŷn. All species mentioned in the citation are still present except for *Caloplaca luteoalba*, the most significant species to have been recorded at the site, and species normally found on maritime rocks e.g. *Anaptychia runcinata* (and *Ochrolechia parella*) are still found here on tree bark (the former on one oak, presumably the same referred to in the citation).

7.5 Changes in the lichen interest since the 1970s

In contrast to the conclusion reached by Purvis & James (2004), the 2023 survey suggests that with the notable exception of *Caloplaca luteoalba* the SSSI seems to have retained much of its notable lichen interest since the 1996 survey by Alan Orange, and indeed to some extent since the 1970s. Species such as *Acrocordia gemmata* and *Gyalecta truncigena* were recorded for the first time since the 1970s, and the majority of notable species recorded by Alan Orange in 1996 were re-recorded e.g. *Anisomeridium robustum*, *Pachyphiale carneola*, *Scytinium teretiusculum* and *Thelopsis rubella*. With the addition of new notable species with the 2023 survey, this suggests the lichen interest seems to be faring reasonably well.

Caloplaca luteoalba has declined enormously in GB and Ireland since the loss of elms to Dutch elm disease (see Figure 7). This is almost certainly the case at Baron Hill Park SSSI, although young elms do persist in the area, and there is potentially suitable habitat on sycamore bark and wood (Woods 2023). Other taxa have not been recorded since the 1970s or 1996 however these tend to be commoner, widespread or otherwise not notable taxa based on current assessments.

Figure 7. Distribution of *Caloplaca luteoalba* in Britain and Ireland (BLS, 2023). Red: post 2000 record / blue: 1960-1999 / green: 1650-1959

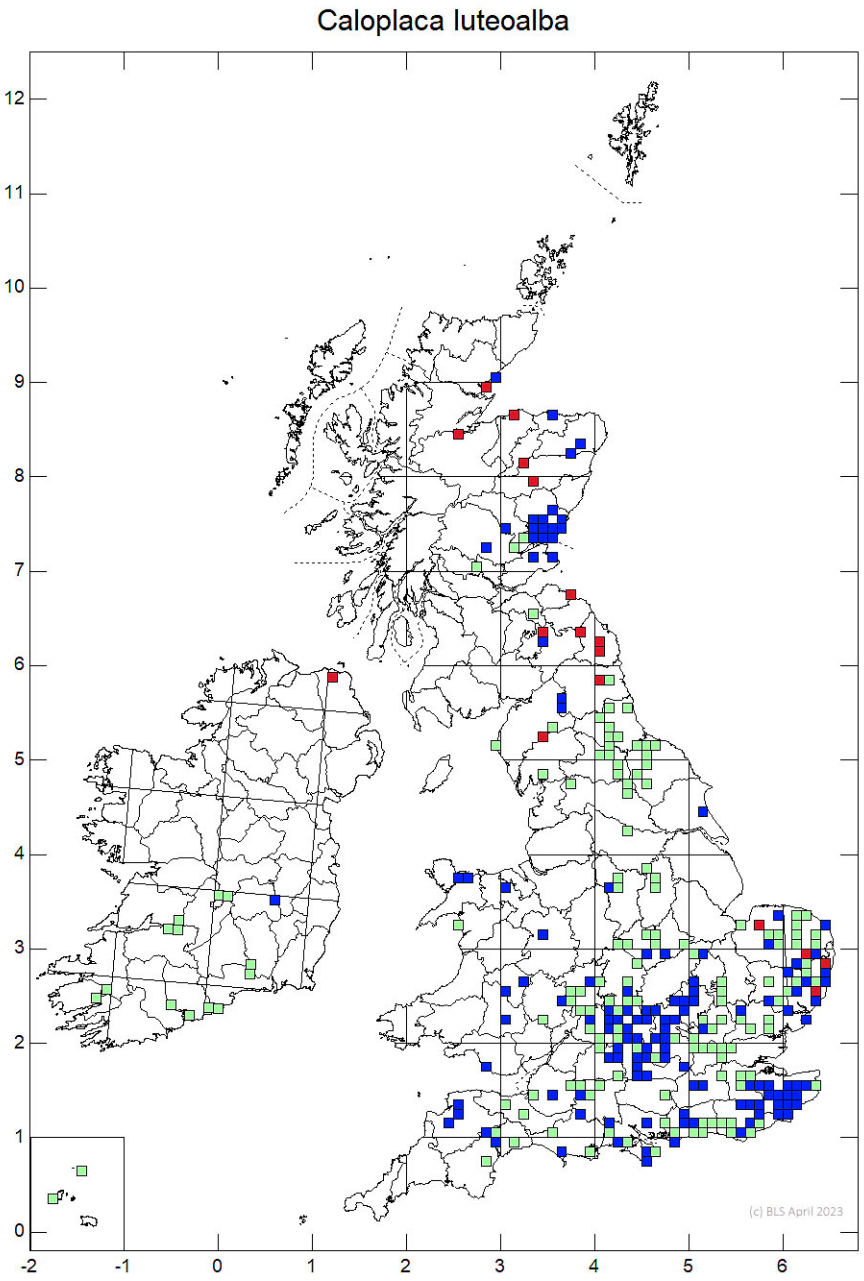


Figure 8. Dead sycamores in Field 1.

Figure 9. A healthy young elm on the edge of Field 1.

7.6 Habitat management issues and recommendations

The main habitat management issues at Baron Hill Park SSSI are:

Future mature and veteran trees; there is a large generation gap in the tree resource, as is common in many British parkland sites. As it stands it seems unlikely that the more significant lichen interest will survive this generation gap. Indeed it feels like the whole parkland landscape at Baron Hill Park SSSI is unlikely to survive as it stands. There has been some planting, although not enough and, as is typical in farmed parkland sites, the new trees tend to have been grouped and not necessarily planted in a way that will create large open-grown parkland trees (Figures 11, 14). The planting also includes a number of ash, which are now succumbing to ash dieback. Whilst it feels like something of a long-shot in terms of securing the future of the existing interest the following could be tried:

- More planting to create scattered open grown trees, the planting needs to be close enough to existing trees to allow eventual colonisation by lichens, but not so close as to impact on either existing trees or for existing trees to impact on newly planted trees.

- Species to include in planting schemes would be oak, sycamore, horse chestnut, common walnut and should disease resistant varieties be available then ash and elm. Oak is probably the most important.

- Veteranisation of younger trees to create veteran features at earlier age than would occur naturally (see Figure 10).

- Surgery to protect existing trees. Some trees seem to be succumbing to disease or otherwise appear unhealthy, including some very important trees e.g. BH16 which should be assessed urgently. Note: any surgery needs to avoid any damage to the lower trunks with lichen interest.

- The existing woodland resource adjacent (to the west) could potentially be utilised to create suitable conditions for parkland lichens by opening this up to grazing and restructuring. This may prove a better way to create suitable conditions than planting which will take hundreds of years to produce suitable habitat.

Management of pasture; the pasture management in Baron Hill Park SSSI appears on the intensive side, or at least it would certainly benefit from less intensive management. There are signs of ammonia enrichment in the form of nitrophile species on trunks, branches and twigs, manure splats were seen on trunks (see Figure 12) and there were examples of livestock damage to bark e.g. rubbing on trees and potentially also bark stripping. Whilst the latter can create good niches for lichens, this is frequent, especially in Fields 4 and 5 and it seems likely this has led to the negative impacts on tree health (there are a good number of dead or dying sycamore in the SSSI, see Figures 8, 13). Moving to less intensive management of the pasture (whilst maintaining grazing) would probably be beneficial.

Air pollution impacts; as discussed above there appears to be reasonably high levels of ammonia deposition in the SSSI, this will be partly derived from the management of the parkland itself but also likely travelling from further afield. The lack of *Usnea* species and *Evernia prunastri* within the park (neither were recorded), and general scarcity of base-rich bark species suggests historic SO2 pollution may have had impacts, in addition to that of ammonia.

Fallen decaying wood management; in Field 3, in some cases fallen wood has been moved under the tree canopy close to the trunk, in an ideal world it would be left as is (as has happened in Field 1).

Figure 10. Young oaks in Field 1 that could be candidates for veteranisation.

Figure 11. Relatively recent overly dense / unthinned planting, including ash badly affected with ash dieback.

Figure 12. A manure splat on the trunk of an old oak.

Figure 13. Base of sycamore damaged, presumably by cattle. Whilst this does provide interesting niches for lichens, many trees here are impacted like this which may have impacted on tree health.

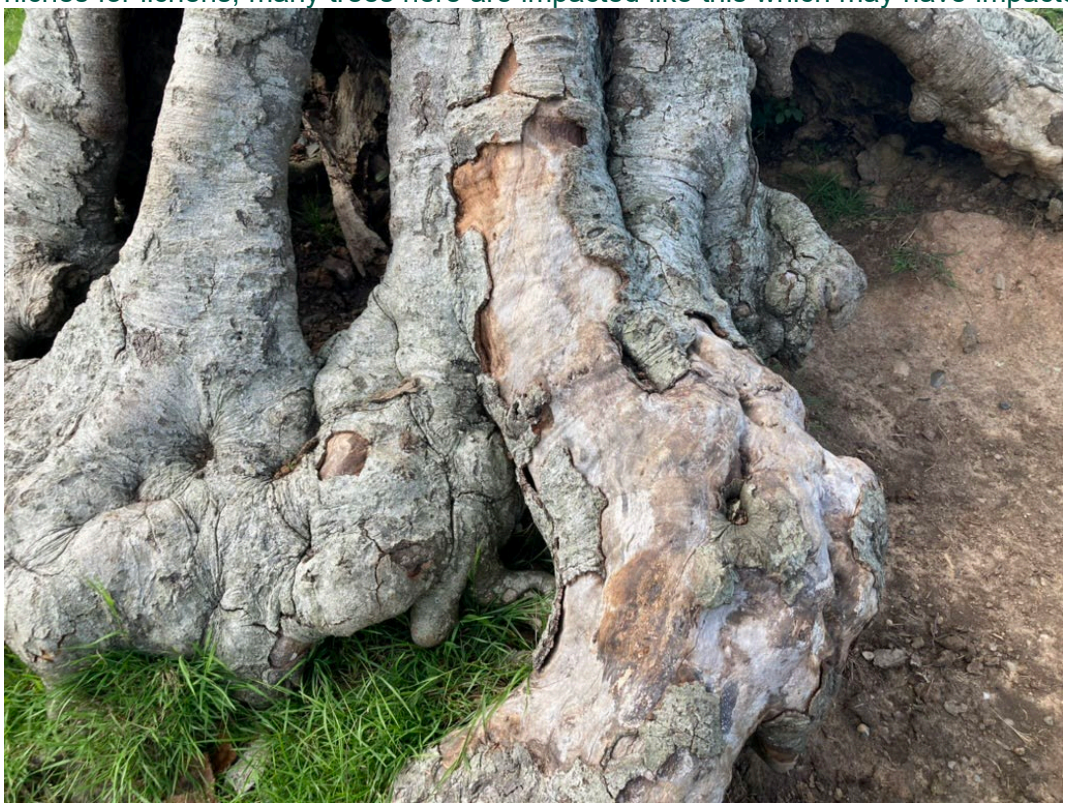


Figure 14. A too dense / unthinned planting of ash, succumbing to ash dieback and with bark damage.

8. References

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Appendices

The Appendices of data tables and location photographs have been removed from this version of the report because it is not possible to make them comply with Accessibility legislation. Full PDFs of the report are stored by the Natural Resources Wales Library and the National Library of Wales.

Data Archive Appendix

Data outputs associated with this project are archived on server–based storage at Natural Resources Wales.

The data archive contains:

[A] The final report in Microsoft Word and Adobe PDF formats.

[B] A spreadsheet of biological records in Microsoft Excel format.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue https://libcat.naturalresources.wales (English Version) and https://catllyfr.cyfoethnaturiol.cymru (Welsh Version) by searching 'Dataset Titles'. The metadata is held as record no 125704

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