# LICHEN SURVEY OF RYDAL PARK

# WESTMORLAND

# 2019

March 2020

N A Sanderson BSc MSc

For Plantlife

BACK FROM THE BRINK

British Lichen Society

# EPIPHYTIC LICHEN SURVEY OF RYDAL PARK WESTMORLAND, 2019

**Contents**

**Cover Photograph**: **Photo 2019-09-04-03**, the survey team studying one of the very rich ancient Oaks by the Rydal Beck (RDN008) in the Lower Park. The oldest trees in the Lower Park predate the formation of the landscape park of the Lower Park and were boundary trees within the previous inbye land the Lower Park replaced.

**Acknowledgements**: thanks to all at the meeting, Brain Coppins my fellow leader and Steve Price and Dave Lamacraft for organising the meeting.

# EPIPHYTIC LICHEN SURVEY OF RYDAL PARK WESTMORLAND, 2019

## 1.0 INTRODUCTION

### 1.1 Background & Brief

#### 1.1.1 Background

Rydal Park is an area of parkland and pasture woodland on south west facing slopes and bottom land east of the village of Rydal. The park had been visited by Francis Rose in 1970 and 1981 and important species such as *Lecanora quercicola* VU (NS/IR/S41) and *Lobaria pulmonaria* Nb (IR) were recorded but there appeared to have been no other visits by lichenologists. However, a 2018 veteran tree survey emphasised the large population of veteran trees in this area and rediscovered several veteran trees with *Lobaria pulmonaria* Nb (IR) and *Lobaria virens* Nb (IR). A reconnaissance by Dave Lamacraft and April Windle in March 2019 confirmed the potential high interest by discovering a population of *Caloplaca herbidella* s. str. VU (NR/S41), the first potentially viable English population recorded in recent decades.

#### 1.1.2 Brief

As part of the Back from the Brink, Ancients of the Future project, funded by The National Lottery Heritage Fund, Plantlife requested that the British Lichen Society carry out a lichen survey of Rydal Park (**Map 1**) over a two-day meeting. This was intended to update the knowledge of the lichen assemblage of the park, concentrating on the veteran tree habitat, but examining other lichen habitats as well.

# 2.0 METHODS

## 2.1 Survey Methods

### 2.1.1 Timing, Conditions & Personnel

The survey was carried out between the 4h and 5th September 2019, with some additional recording on 6th. There had been heavy rain the day before but the weather was reasonable during the survey, with the tree bark drying on the second day. Some survey was carried out on the 6th in the morning, before more rain appeared

The meeting was attended by 15 people, with Brian Coppins and Neil Sanderson leading the lichen recording. Those attending were:

Nicola Bacciu
Paul Cannon
Brian Coppins
Vince Giavarini
Russel Gorm
Nerys Jones
Dave Lamacraft
Pete Martin
Allan Pentecost
Steve Price
Maxine Putnam
Neil Sanderson
Caz Walker
Tim Wilkins
April Windle

### 2.1.2 Areas Surveyed

The survey route taken by Neil Sanderson is shown on an OS map base (**Map 2** & **3**) as derived from the track logs of a GPS receiver. This shows the general area surveyed only, as other people ranged off this route. The density of species recording by all is shown on **Map 45**.

In the time available it was not possible to visit all of the park (**Map 1**). The survey concentrated on the area east of Rydal, where the parkland and pasture woodland habitat was already known to be of interest (Lower, Middle and High Parks). A brief reconnaissance was made to Nabb Scar to refind a known *Lobaria* tree and get an idea of the habitat. Sweer Rigs, which has some veteran trees on the lower slopes was not reached. The survey also strayed outside of the main units. The Campsite is an extension of the same habitat as Middle Park and proved to be very lichen rich and was included in the survey, both by Neil Sanderson, who was staying in a camping pod in the campsite and by the whole group passing through to High Park. In addition, Vince Giavarini, recorded mainly lichenicolous fungi in the far west of Lower Park, west of Rydal Beck. This was similar parkland habitat to the rest of Lower Park. The recording compartments used are described below (some information on the history was taken from the Register of Historic Parks and Gardens of Special Historic Interest in England <https://historicengland.org.uk/listing/the-list/list-entry/1000671>):

- **Lower Park**: a landscape park on inbye land below the old Ambleside to Grasmere coffin route. The historic gardens and parkland register implies that this area was still farmland in 1770, but was parkland on an 1840 estate map. There were some very old boundary trees, mainly Oak and some Ash, likely to predate the park, along with clumps of younger, probably mainly early 19th century, trees. The latter were predominantly Oak, but included Sycamore, Sweet Chestnut and Beech. There are some Hawthorn and Hazel along the river. The swards are species poor permanent pastures. The north of this area was well surveyed, but the south was not reached. The lichen interest was fading out to the south at the southern edge of the survey.

- **Middle Park**: a landscape park on the slopes above the old Ambleside to Grasmere coffin route. The boundary between this area and High Park is a recent 19th century one marked only by a cast iron fence with no wall or bank. This area of park was probably created out of similar out bye pasture woodland as seen in High Park above in the early 19th century. This was probably done thinning out the wood. There are some very old Oaks, including a maiden Oak of 5.31m girth (RDN015), a few ancient Hollies and an Ash pollard, along with ancient Alder stools and younger Oak, Sycamore, Ash and Beech. The sward is species rich unimproved grassland with patches of flushed grassland. The north of the side is well surveyed but the south was not reached and may harbour further lichen interest.

- **High Park**: an out-by pasture woodland higher on the slopes above. This was shown as pasture woodland on a 1770 estate map, when the lower park was still in bye farmland. The pasture woodland includes flushed Alder stands, groves of veteran Oak lower down and veteran Ash higher up. There are rare ancient Hollies and occasional planted exotics including Beech and horse Chestnut. There are frequent glades with much Bracken and areas of flushed grassland. The survey was a transect up and down through the wood and sizable areas were unsurveyed and likely to be of lichen interest.

- **Sweer Rigs**: not reached in 2019 but the ancient tree survey indicates that there is a concentration of veteran in an area of small fields, mainly Ash and Oak. Potentially of lichen interest but likely to have been badly impacted by acid rain and mists.

- **Nab Scar**: only briefly looked at. The upper slopes include a magnificent old growth Oak dominated out bye pasture woodland, with some groves of old Holly and an old Wych Elm. What was seen of the site suggested it was very badly acidified but some further lichen interest is likely to survive, especially on older trees lower down on the slopes below the old Ambleside to Grasmere coffin route. The latter were not seen in 2019.

The survey strategy was to make transects across the site taking in both known areas of interest and examples of the main habitats within the park.

### 2.1.3 Recording Trees of Interest

The locations of trees particular interest supporting rare species which were recorded systematically (see section **2.1.4** for definition) were located as waypoints using a

GPS receivers by Neil Sanderson and others (**Maps 5 – 44**). These were intended to allow the mapping of species, assemblage and habitat distributions and the conservation interest across the park. Neil Sanderson's waypoints were recorded when the indicated accuracy was about ± 5m or less. Where the interest was very concentrated, with frequent trees of interest, about 10m separation was maintained between waypoints. Some trees of interest were recorded separately by other members of the survey team.

The codes used for Neil Sanderson's waypoints were RDN and then a sequential waymark number, e.g. RDN001 etc. RDB001 etc was used for Brain Coppins' data, RDD001 etc for Dave Lamacraft and RDP001 for Steve Price's records. The data on the GPS recorder was downloaded to Garmin BaseMap software and manipulated in this software. The final data was then exported as GPX files to the GIS programme QGIS, where it was mapped on to royalty free OS mapping.

For each tree recorded, the tree species, physiological age and habitat was noted.

Late in the write up the author mastered using the TomBio plug in in QGIS. This enabled wider mapping of a wider range of interesting species and some assemblages on a 100m grid with locations indicated on a 10m, where detailed recording was available (**Maps 45 – 47** & many more in folder <Rydal QGIS Spp Maps>)

### 2.1.4 Species Recording

All epiphytic lichen species and associated fungi visible from the ground were recorded (**Annex 2**). As such the concentration was on the lower trunk habitats, especially on older trees and bushes, particularly in sheltered areas; the typical habitat of species of conservation interest. Habitats that contribute considerably to the lichen diversity, but are normally dominated by commonplace species, such as twigs and branches, inevitably were not so closely examined. As a result, the species list produced will not be complete but epiphytic species of nature conservation interest will have been more thoroughly recorded. Work in Sweden has shown that surveying the bottom 2m of trunks of the fallen trees only recorded about a quarter of the lichens species of conservation interest on the whole trunk (Fritz, 2009). However, he found that most of the missed species of interest could be found within 2m of the ground on other trees within the site if an extensive survey was carried out. This indicates that extensive ground based surveys will be likely to adequately sample the total flora of lichens of conservation interest, but could significantly underestimate populations size.

Twigs are rapidly colonised by highly mobile species and this can be informative. The composition of the lichen assemblage on the twigs gives an indication of the recent air chemistry, which is not confused by residual effects of past pollution as can occur on trunks (Wolseley et al, 2006). Oak is the best species to observe this, both because of its widespread distribution and its naturally acid bark allows the clear expression of current nitrogen pollution. Where possible the lichen assemblage of Oak twigs was checked to estimate current air pollution levels.

Vince Giavarini, made a special survey of lichenicolous fungi (fungi parasitic on lichens), leading to an impressive list of these less well recorded organisms.

A selection of species, which included all national Threatened or Near Threatened RDB species, the more easily recorded Notable species and some other species of ecological significance, were systematically mapped. It was not possible to systematically record all national Notable species, as some are not easy to record systematically.

All trees with the systematically recorded species were located using a GPS receiver and mapped as a broad brush monitoring exercise (**Maps 2 – 42** & **Annex 1**). For these species the frequency of occurrence was estimated as D = Dominant, A = Abundant, F = Frequent, O = Occasional and R = Rare. In addition, on these trees, all additional species of conservation interest present were also noted.

**Systematically Recorded Species:**

| **Species** | **Conservation Status** | **Habitats** |
|---|---|---|
| *Agonimia octospora* | NT (NS/IR) | Base Rich Bark |
| *Bacidia subincompta* | VU (NS/S41) | Base Rich Bark |
| *Biatora vernalis* | Nb (NS) | Acid Bark |
| *Bryobilimbia sanguineoatra* | Nb (NS) | Acid Bark |
| *Calicium lenticulare* | Nb (NS/IR) | Acid Bark |
| *Caloplaca herbidella s. str.* | VU (NR/S41) | Mesic Bark |
| *Cetrelia cetrarioides* | | Acid Bark |
| *Chaenothecopsis nigra* | Nb (NS) | Lignum |
| *Gyalecta flotowii* | NT (NS) | Base Rich Bark |
| *Hypotrachyna taylorensis* | Nb (IR) | Acid Bark |
| *Lecanora quercicola* | VU (NS/IR/S41) | Mesic Bark |
| *Lobaria pulmonaria* | Nb (IR) | Base Rich Bark |
| *Lobaria virens* | Nb (IR) | Base Rich Bark |
| *Microcalicium ahlneri* | Nb (NS) | Lignum |
| *Mycobilimbia pilularis* | | Base Rich Bark |
| *Mycoporum lacteum* | NT (NS) | Smooth Bark |
| *Pannaria conoplea* | Nb (IR) | Base Rich Bark |
| *Parmeliella parvula* | Nb (IR) | Base Rich Bark |
| *Parmeliella triptophylla* | Nb (IR) | Base Rich Bark |
| *Peltigera collina* | Nb (IR) | Base Rich Bark |
| *Phaeographis inusta* | Nb (NS/IR) | Smooth Bark |
| *Phyllopsora rosei* | Nb (NS/IR) | Base Rich Bark |
| *Ramonia dictyospora* | NT (NS/IR/S41) | Base Rich Bark |
| *Rinodina griseosoralifera* | Nb (NS) | Base Rich Bark |
| *Rinodina isidioides* | NT (NS/IR/S41) | Base Rich Bark |
| *Rinodina roboris* var. *roboris* | Nb (IR) | Base Rich Bark |
| *Sticta limbata* | Nb (IR) | Base Rich Bark |
| *Thelopsis rubella* | | Base Rich Bark |

Neil Sanderson's site notes were made on an iPhone in the field and the field notes have been edited and added to the report in **Annex 1**. Additional records of other surveyors were interpolated into **Annex 1**. The species recorded are given in **Species List 1, Annex 2** and the data was converted into a BLS Recorder import spreadsheet <VC 69 Rydal Park_BLS_General_v6f_BJC SGP-NAS Final.xlsx> to allow importation into the BLS database, these will later be available on the NBN.

### 2.1.5 Trees

The terms used to describe the physiological age of the tree are explained below. These are based on Harding & Alexander (1993):

- Mature: a tree that has reached its full height and is still vigorous, heart rot likely to be absent.
- Post-mature: a tree that is no longer vigorous and has started retrenching by branch die back. Heart rot will have commenced but will not be easily visible.
- Ancient: a tree with major branch die back and or extensive and visible heart rot.

The term 'veteran tree' is taken to include both post-mature and ancient trees. This classification reflects the natural processes that older trees go through as a response to balancing their increasing size with the photosynthetic area available. The commencement of heart rot indicates the end of the commercial usefulness of timber

## 2.2 Data Analysis

### 2.2.1 Nomenclature

The nomenclature mainly follows Sanderson et al (2018) for lichens and lichenicolous fungi but includes changes accepted by the BLS taxon dictionary since then <http://www.britishlichensociety.org.uk/resources/lichen-taxon-database>. New names added since Woods & Coppins (2012) and used in this report are listed below:

| **New Name** | **Old Name** |
|---|---|
| *Agonimia flabelliformis* | *Agonimia allobata* s. lat. |
| *Bryobilimbia sanguineoatra* | *Lecidea sanguineoatra* |
| *Dendrographa decolorans* | *Schismatomma decolorans* |
| *Heterocephalacria physciacearum* | *Syzygospora physciacearum* |
| *Lepraria finkii* | *Lepraria lobificans* |
| *Lichenodiplis pertusariicola* | *Laeviomyces pertusariicola* |

### 2.2.2 Ancient Woodland Indicators

Dr Francis Rose (Rose, 1992 & Coppins & Coppins, 2002a) devised several indicator lists that can be used to assess the diversity and conservation value of woodland epiphytic lichen assemblages in different climatic areas. These replaced an earlier more general indicator list the 'Relative Index of Ecological Continuity' (RIEC) Rose (1976). The indices are ideally applied to about 100ha of woodland. The indices were recently reviewed (Sanderson, in press a), mainly with the aim of simplifying the application of the indices, by removing multiple choices. The thresholds for considering sites for SSSIs were also reviewed and updated in preparation for the updated SSSI selection criteria for lichens (Sanderson et al, 2018). Some minor changes were also made to the species used. To reflect the changes, the indices were given new and more informative names.

These lists indicate habitat quality; the total number of species found is the important parameter. The indicator species are associated with late succession stands with veteran trees (old growth stands i.e. stands more than 200 years old), especially those stands with a past continuity of old trees (Alexander et al, 2002). Woods that have been clear felled, but regenerated, within the last 200 years (young growth stands) are therefore likely to be poorer in lichen indicator species than less disturbed stands. The lichen ancient woodland indicator lists are different from similar ancient woodland indicator lists composed of vascular plants or bryophytes. The latter

reflect ancient sites rather than stands and are much less effected by the management of the trees.

There are two main appropriate lists for the Lake District, the Southern Oceanic Woodland Index (SOWI) and the Upland Rainforest Index (URI). The SOWI (formerly the New Index of Ecological Continuity, NIEC) is designed for oceanic temperate woodland south of the Scottish Highlands, it is the primary relevant index here. The URI (formerly the Eu-oceanic Calcifuge Index of Ecological Continuity, EUOCIEC) is also a useful index covering woods on more acidic soils and higher up the slope in very wet areas of Britain. Also relevant to this site is the Pinhead Index (Sanderson et al, 2018).

- **Southern Oceanic Woodland Index (SOWI)**: applies to oceanic temperate woodland south of the Scottish Highlands. Sanderson (in press a) regarded sites with an index score of 20 or more as being national significance, while sites with scoring more than 30 are regarded to be as likely to be of international significance. Such woods are usually old growth stands with a strong continuity of veteran trees. In the Lake District, it is recommended that a score of 20 be used as the threshold for considering sites for SSSI status (Sanderson et al, 2018).

- **Upland Rainforest Index (URI)**: covers acidic and leached woodlands in very high rainfall areas in hyper-oceanic to eu-oceanic climates. Sanderson (in press a) regarded sites with an index score of 10 or more as being national significance, while sites with scoring more than 15 are regarded to be as likely to be of international significance. In the Lake District, it is recommended that a score of 10 be used as the threshold for considering sites for SSSI status (Sanderson et al, 2018).

- **Pinhead Index** (Sanderson et al, 2018). For this the total number of recorded Pinhead species in the genera *Calicium*, *Chaenotheca*, *Chaenothecopsis*, *Microcalicium*, *Mycocalicium* and *Sclerophora* is used as an index score. This index measures the quality of ancient tree and dead wood habitat, sites scoring more than ten are can be regarded as being of national importance and this is also the threshold for considering sites for SSSI status.

### 2.2.3 Rarity & Threat

The definitions of Red Data Book (RBD) status follows Woods & Coppins (2012), who also added a concept of International Responsibility Species:

- **International Responsibility Species**: this is a new category that recognises that some species are commoner in Britain than elsewhere. They are absent, rare or threatened in the rest of Europe and are thought, on existing data, to have 10% or more of their European or World population in Britain. These could be considered as more important than some Red Data Book species, which are common elsewhere in the world. The significance of these species depends on their actual British and local rarity but special attention needs to be paid to them in management.

The Nationally Rare and Nationally Scarce status in Woods & Coppins (2012) are now out of date and updated assessments were obtained from the BLS web site at <http://www.britishlichensociety.org.uk/resources/lichen-taxon-database>.

Significant populations of threatened species (Vulnerable or higher) or Near Threatened species, which are also International Responsibility species either nationally or within SSSI areas of search can be considered as nationally significant and as potentially notifiable features of an SSSI (Sanderson et al, 2018).

***Notable Species***: Sanderson (2011 & in press b) has reviewed the measurement of rarity for species not assessed as threatened, or as Near Threatened, species in the RDB. Many declining lichens or those restricted to vulnerable habitats, which are Nationally Scarce, have now been assessed as Threatened or Near Threatened lichen species. In contrast, several ephemeral Nationally Rare species of ruderal habitats are now assessed as least concern. As such the old Nationally Rare/Nationally Scarce assessment was not thought useful any more. As an alternative Sanderson (2011) proposed that all Least Concern or Data Deficient species which were Nationally Rare Nationally Scarce or International Responsibility species be put in a single category "Notable species" (Nb). Sanderson (2018b) reviewed the potential Notable species and excluded those that were clearly under-recorded common species or ruderal species of limited conservation interest. This list is given in Sanderson (2018a) and is followed in this report.

Sanderson (2018b) suggested an alternative scoring system to that of Hodgetts (1992) (Threatened, Near Threatened and Notable (TNTN) scoring). The score is calculated as follows:

**GB Threatened (CR, EN, VU)** – scores 4 points.

**GB Near Threatened** – scores 2 points.

**Notable** – scores 1 point.

None of the above – scores nil.

This scoring system can be used in woodland habitats, but is considered less useful than the woodland indices in this habitat and is recommended mainly for habitats lacking suitable habitat indices. It is not adopted by Sanderson et al (2018) as a priority method of assessing woodland.

***Section 41 Species***. The former BAP list (Biodiversity Reporting and Information Group, 2007) provided the basis of the lichens listed under Section 41 of the Natural Environment & Rural Communities (NERC) Act 2006. Species on this list are considered to be of "principal importance for conservation of biological diversity in England".

The BAP list was revised (Biodiversity Reporting and Information Group, 2007) and, unlike the earlier list, is a reasonably comprehensive list of those lichen species likely to be under particular stress and amenable to conservation action to reverse this. Conservation of these species is regarded as being an important contribution to Britain's obligations under the Rio Convention on Biodiversity. Collectively, however, the Section 41 species list is not an objective tool for assessing conservation importance, habitat indices, RDB populations and the list of Notable species provide this.

Abbreviations used in the text and tables are listed below:

RDB = Red Data Book Species, (CR, EN, VU & NT Species)
VU = Vulnerable Red Data Book species
NT = Near Threatened Red Data Book species
Nb = Notable species (NR, NS, IR or S41 species of conservation interest not RDB NT or higher)
NR = Nationally Rare
Nb (NS) = Nationally Scarce regarded by Sanderson (2017b) as being of significant conservation interest
(NR) = Nationally Rare lichen not regarded by Sanderson (2017b) as being of significant conservation interest
(NS) = Nationally Scarce lichen not regarded by Sanderson (2017b) as being of significant conservation interest
[NR] = Nationally Rare lichenicolous fungus not included in Smith et al (2009) and likely to be very under recorded
[NS] = Nationally Scarce lichenicolous fungus not included in Smith et al (2009) and likely to be very under recorded
IR = International Responsibility species
S41 = Section 41 species

***A Lichen Red Data List for England.***
A lichen Red Data List for England, is in initial draft. The differences from the national list reflects the high level of threat to many epiphytic species, especially those of the Base Rich Bark Woodland Community (*Lobarion*), which still have strong populations in western Scotland, but are threatened further south. Many species recorded at Rydal Park, which are of Least Concern in the British Red List, are likely to be given at least Near Threatened status in England. These include 15 British Least Concern species raised to Near Threatened in England: *Bryobilimbia sanguineoatra*, *Cetrelia olivetorum* s. lat., *Hypotrachyna taylorensis*, *Lobaria pulmonaria*, *Lobaria virens*, *Lopadium disciforme*, *Micarea stipitata*, *Microcalicium ahlneri*, *Mycoblastus sanguinarius*, *Pannaria conoplea*, *Parmeliella parvula*, *Parmeliella triptophylla*, *Parmotrema crinitum*, *Peltigera collina*, *Phyllopsora rosei* and *Sticta limbata*. With *Calicium lenticulare* raised to Vulnerable and *Biatora vernalis* to Endangered. In addition, *Caloplaca herbidella* s. str. and *Lecanora quercicola* are proposed to be raised from Vulnerable to Endangered and *Bacidia subincompta* from Vulnerable to Critically Endangered.

This draft list was used in the methodology for devising mapping categories as it reflects English conservation priorities well, but was not used in any analysis or in the main text due to its first draft status.

### 2.2.4 Communities
Most lichens species have limited tolerances of bark and habitat conditions. This allows the formation of distinctive communities (James et al, 1977). Simple English names have been invented with the technical names given in brackets.

### 2.2.5 Mapping the Quality of Lichen Interest
The conservation interest of the lichen flora at the waypoints was assessed and mapped, with different symbols assigned to different levels of interest in Garmin BaseCamp/QGIS.

**Purple**: location with systematically recorded British or draft English RDB Vulnerable or higher species, a selectable species in the SSSI criteria (assuming the draft English RDB status remains in this category after review).

**Red**: location with a systematically British RDB Near Threatened species, which is also an International Responsibility, so a selectable species in the SSSI criteria.

**Orange**: location with a systematically British RDB Near Threatened species, which is not an International Responsibility, or draft English RDB Near Threatened species, not covered above, so not selectable species in the SSSI criteria.

**Blue**: location with other systematically recorded British Notable species or other species of ecological significance.

In addition, the distributions of individual lichen communities (**Maps 6 – 9**), the tree species supporting systematic recorded species (**Maps 10 – 15**) and systematically recorded species (**Maps 16 – 42**) were mapped. A wider range of species of interesting species and some assemblages on a 100m grid with locations indicated on a 10m, where trees were available (**Maps 45 – 47** & many more in folder <Rydal QGIS Spp Maps>).

### 2.2.6 Existing Data

April Windle obtained the previous survey data for Rydal Park from the BLS database. This contained no significant epiphytic species not seen during the 2019 survey.

# 3.0 SURVEY

## 3.1 Lichen Assemblage

### 3.1.1 Totals

The list of lichen and associated fungi species list recorded in 2019 is given in **Species List 1** in **Annex 2**. A total of 277 taxa were recorded during the survey, of these 231 were lichens, 34 lichen parasites (lichenicolous fungi) and 10 associated non-lichenised fungi. Of these 47 of these were new records to Westmorland, 27 of which were lichenicolous fungi, a testament to Vince Giavarini efforts looking at this neglected group. A total of 244 taxa were recorded as epiphytes with an additional taxa 33 on the rocks

Epiphytic species of interest recorded for the SSSI included 34 Southern Oceanic Woodland Index (SOWI) species and 14 Upland Rainforest Index (URI). In addition, three Vulnerable, five Near Threatened and 31 Notable species were recorded. The overall totals and totals for the separate recording units are listed in **Table 1**. The combined total is also given for the Middle Park and the Campsite, as the habitat in the Campsite is an extension of the habitat in Middle Park.

These totals show rich epiphytic assemblages in Lower Park, Middle Park, Campsite and High Park, with the combined Middle Park and Campsite richest over all in species of interest. The whole site has high scores for the Lake District for SOWI Index Scores and URI Index Scores and 6 species potentially individually selectable as SSSI criteria were recorded. Middle Park, Campsite and High Park individually exceeded the SSSI criteria for SOWI, while the combined Middle Park and Campsite and individually the High Park also pass the criteria of the URI. All these sites have species potentially individually selectable as SSSI criteria, with the most recorded in Lower Park.

**Table 1**
**Total Numbers of Lichens Recorded from Rydal Park 2019**

| Species | Lower Park | Middle Park | Campsite | Middle Park & Campsite | High Park | Nabb Scar | Rydal Park |
|---|---|---|---|---|---|---|---|
| **Totals** | | | | | | | |
| Total Epiphytic Taxa | 161 | 93 | 77 | 127 | 142 | 5 | 244 |
| Additional Saxicolous Taxa | 17 | 2 | 0 | 2 | 24 | 0 | 33 |
| Total Taxa | 177 | 95 | 77 | 129 | 165 | 5 | 277 |
| **Biodiversity Scores** | | | | | | | |
| SOWI Index Scores | 16 | **21** | **20** | **28** | **21** | 3 | **34** |
| URI Index Scores | 4 | 7 | 8 | **10** | **10** | 0 | **14** |
| Pinhead Index | 4 | 3 | 4 | 5 | 4 | 0 | 9 |
| SSSI Criteria spp | **5** | **3** | **2** | **3** | **1** | 0 | **7** |
| Vulnerable | 2 | 1 | 0 | 1 | 1 | 0 | 3 |
| Near Threatened | 2 | 3 | 2 | 3 | 2 | 0 | 5 |
| Notable | 14 | 10 | 13 | 19 | 15 | 2 | 31 |
| International Responsibility Spp | 9 | 9 | 10 | 15 | 8 | 2 | 21 |
| S41 Species | 3 | 2 | 1 | 2 | 1 | 0 | 5 |
| TNTN Score | 26 | 20 | 17 | 29 | 23 | 2 | 53 |

**Key**
**34** = Index score over the local SSSI quality threshold

### 3.1.2 Lichen Assemblages

The habitats supporting assemblages of lichens interest show a strong gradient up-slope with the communities in Lower Park very different from those in the upper parts of High Park. Lower Park has very rich Base Rich Bark Woodland Assemblages (*Lobarion pulmonariae* & *Agonimion octosporae*) (**Maps 5** & **46**), with both Mediterranean – southern Atlantic (*Agonimion octosporae*) and general oceanic (*Lobarion pulmonariae*) species prominent. Also a very significant, if much more limited, assemblage is a veteran tree variant of the Mature Mesic Bark Community (*Pertusarietum amarae*) with rare sub-oceanic species (**Map 7**). The core of this area of interest is concentrated to within 200m of the very rich old boundary Oak trees on the bank of the Rydal Beck, which predate formation of the park. Within this zone early 19th century parkland trees, mainly Oak, have been colonised by some very rare species, however, beyond this area the younger veteran trees in the Lower Park are of much more limited interest.

Middle Park and the Campsite also have very rich Base Rich Bark Woodland Assemblages (*Lobarion pulmonariae* & *Agonimion octosporae*) (**Maps 5** & **46**), on Oak and Sycamore, again with both Mediterranean – southern Atlantic (*Agonimion octosporae*) and general oceanic (*Lobarion pulmonariae*) species prominent. The Mature Mesic Bark Community (*Pertusarietum amarae*) with rare sub-oceanic species (**Map 7**) also extends into Middle Park. In addition, on the upper slopes of the Middle Park and the Campsite, the Acid Bark Woodland Assemblages (*Parmelion laevigatae*) (**Maps 6** & **47**) on veteran Oak become rich at above 100m. A revelation, on leaving the campsite on the 6th August, was that incoming frontal clouds were forming a mist line at about 100m. The increase in the diversity of acid bark communities is likely to relate to the frequency of mists higher up the slopes; the woodland above 100m is a cloud forest. Also of interest in Middle Park and the Campsite are Dry Lignum Assemblages (*Calicietum abietinae*) (**Map 8**) on large pieces of dead Oak wood, both standing and fallen but propped off the ground and, in Middle Park, Smooth Bark Communities (*Graphidetum scriptae*) (**Map 9** & **12**) on ancient Hollies.

The lower section of High Park has a similar mixture of assemblages to the upper slopes to the Middle Park and the Campsite. The Acid Bark Woodland Assemblages (**Maps 6** & **47**) are well developed on Oak, with the Base Rich Bark Woodland Assemblages (**Maps 5** & **46**) on both Oak (with a rich Oak spotted by the veteran tree survey carried out by Milligan & Preston (2018) but missed by the BLS) and Ash also present. The interest of the latter is dropping off, however, with the southern oceanic element (*Agonimion octosporae*) absent. The Smooth Bark Communities (*Graphidetum scriptae*) also extends up hill on ancient Hollies (**Map 9** & **12**), with further interest on Alder (**Map 14**) and Hazel. Up slope, however, the Oaks lose most of their interest and no interesting Oak was found above about 150m, although old Oaks do extend above this height. Above this high quality communities are confined to Ash (**Map 11**), which supports some significant Base Rich Bark Woodland Assemblages (*Lobarion pulmonariae*) species and a limited Acid Bark Woodland Assemblage. In this area, only a few of the veteran Ash are of high interest, most are species-poor and clearly badly acidified by acid rain pollution.

Rydal Park ranges from a distinctly lowland and southern veteran tree site in lower Park extending into Middle Park and the Campsite through a sharp transition to an upland cloud forest habitat in the upper part of Middle Park and the Campsite into

the High Park. Within the cloud forest, increasing frequency of mists higher up the slope, however, appears to have exacerbated the impact of acid rain pollution. Despite the name acid rain, acid deposition is more damaging from mists that rain.

**Base Rich Bark Woodland Assemblages (*Lobarion pulmonariae* & *Agonimion octosporae*)**: a very rich habitat best developed on veteran trees with base rich bark. Typically found on bark that is flushed by base rich water from above. Unlike many other communities the basic community is composed of ancient woodland species so any occurrence is of interest. On damp bark with a high pH, base demanding mosses are usually prominent. This moss community can occur in both shady and exposed conditions and in both situations the *Lobarion* lichens are absent. However, in intermediate light conditions a rich community of ancient woodland lichens can develop. There is a critical balance between light and humidity, which varies from east to west. In western oceanic humid climates light levels become more critical than shelter from summer sun. The requirement for high pH bark has made the community vulnerable to bark acidification caused by air pollution and some of the most sensitive species have declined drastically over the 20th century.

The habitat shows a strong north to south gradient, with classic large leafy species dominant with fewer crust forming lichens in the north west (*Lobarion pulmonariae*), while to the south west the habitat is much richer in crust forming species (*Agonimion octosporae*). The latter community replaces the *Lobarion* in shaded humid woods in oceanic Mediterranean and southern Atlantic climates. The *Agonimion octosporae* is something of a "deep forest" assemblage and is best developed in large little disturbed old growth woodlands.

A total of 30 species of conservation interest were been recorded from this habitat, the highest total from an individual habitat (**Table 2**). The park still has an impressive assemblage for England of leafy *Lobarion* species including *Lobaria pulmonaria* (**Map 26**), *Lobaria virens* (**Map 27**), *Pannaria conoplea* (**Map 31**), *Parmeliella parvula* (**Map 32**), *Parmeliella triptophylla* (**Map 33**), *Peltigera collina* (**Map 34**), *Peltigera horizontalis* (supporting the rare lichenicolous fungi *Scutula epiblastematica*) and *Sticta limbata* (**Map 41**). Most of these are sensitive to acidification, and are found on Oak and Sycamore lower down but only Ash where they occur above about 120m. *Phyllopsora rosei* (**Map 36**) is a more acid tolerant oceanic species, which is found higher in High Park on Ash. *Lopadium disciforme* is a similarly more acid-tolerant lichen, but with a more northern distribution. It also is confined to Oak lower down but was only seen on Ash high up. Crust forming general oceanic species include the rare Lake District specialist *Bacidia subincompta* (**Map 17**), along with more widespread species such as *Bacidia biatorina*, *Leptogium subtile*, *Leptogium teretiusculum*, *Mycobilimbia epixanthoides* (**Map 29**), *Mycobilimbia pilularis* (**Map 30**) and *Pachyphiale carneola*.

The Mediterranean – south Atlantic element (*Agonimion octosporae*) is found mainly below 100m and entirely on Oak. This element includes the rare species *Agonimia octospora* (**Map 16**), new to Westmorland, and *Rinodina isidioides* (**Map 39**), both of which have large populations for northern England. Other southern-western species include *Agonimia flabelliformis*, *Porina borreri*, *Ramonia dictyospora* (**Map 37**), and *Rinodina griseosoralifera* (**Map 38**), which were all new to Westmorland. Other species of interest include *Rinodina roboris* and *Thelopsis rubella*. An undescribed isidiate

*Catinaria*, which was previously only known from the New Forest (*Catinaria* "*isidioides*"), was collected from the Oaks by the Rydal Beck in March by Dave Lamacraft. This has been overlooked as *Bacidia biatorina*, as the thallus is similar. In addition, another undescribed, but this time, sequenced taxa was spotted in a wound track on an old oak in the campsite. This keys out in the key to sterile lichens in Smith et al (2009) at the *Opegrapha corticola*/*Opegrapha multipuncta* (the latter now *Porina multipuncta*) couplet, but lacks the thick thallus and buff coloured soredia of *Opegrapha corticola*, having a thin thallus and orange soredia like *Porina multipuncta*, but has defined circular soralia like *Opegrapha corticola*. DNA sequencing has shown it to be neither *Opegrapha corticola* or *Porina multipuncta* but the placement of this taxa has not yet been determined[1]. Both of these are also probable southern oceanic species.

A total of 24 trees were waymarked as supporting at least one of the 16 systematically recorded species, which are characteristic of this habitat, in 2019 (**Map 5**). The wider distribution of most of the species of interest in this assemblage can be seen on **Map 46**. These show the strong development of the habitat in the north of Lower Park, the combined Middle Park north and the Campsite. The assemblage is more weekly developed in High Park but the veteran Ash high on the slope are significant.

**TABLE 2**
**Species Of Interest Recorded in Base Rich Bark Woodland Assemblages 2019**

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | Conservation Status |
|---|---|---|---|---|---|---|
| Agonimia flabelliformis | | | 1 | | | Nb (NR) S |
| Agonimia octospora | | 1 | 1 | | | NT (NS/IR) S |
| Bacidia biatorina | 1 | 1 | 1 | 1 | | S |
| Bacidia subincompta | | | | 1 | | VU (NS/S41) |
| Catinaria "isidioides" | 1 | | | | | (NR) |
| Francisrosea bicolor | | | 1 | | | (NR) |
| Gyalecta flotowii | | | | 1 | | NT (NS) |
| Leptogium lichenoides | | 1 | | 1 | 1 | S |
| Leptogium subtile | | | | 1 | | Nb (NS) |
| Leptogium teretiusculum | 1 | | | 1 | | S |
| Lobaria pulmonaria | 1 | 1 | | | | Nb (IR) S |
| Lobaria virens | | 1 | | | 1 | Nb (IR) S |
| Lopadium disciforme | 1 | 1 | 1 | 1 | | U |
| Mycobilimbia epixanthoides | 1 | 1 | 1 | 1 | | S |
| Mycobilimbia pilularis | | | 1 | 1 | | S |
| Pachyphiale carneola | 1 | 1 | 1 | 1 | | S |
| Pannaria conoplea | 1 | 1 | | 1 | | Nb (IR) S |
| Parmeliella parvula | | | 1 | | | Nb (IR) S |
| Parmeliella triptophylla | | 1 | 1 | 1 | | Nb (IR) S |
| Peltigera collina | 1 | | | | | Nb (IR) S |
| Peltigera horizontalis | 1 | 1 | 1 | 1 | | S |
| Phyllopsora rosei | 1 | | 1 | 1 | 1 | Nb (NS/IR) S |
| Porina borreri | 1 | | | 1 | | Nb (NS) |
| Ramonia dictyospora | 1 | | | | | NT (NS/IR/S41) |
| Rinodina griseosoralifera | 1 | | | | | Nb (NS) |
| Rinodina isidioides | 1 | 1 | 1 | | | NT (NS/IR/S41) S |
| Rinodina roboris | 1 | 1 | 1 | 1 | | Nb (IR) |

[1] Now named *Francisrosea bicolor* Ertz & Sanderson in ed.

| | | | | | | |
|---|---|---|---|---|---|---|
| Scutula epiblastematica | 1 | 1 | | | | [NR] |
| Sticta limbata | 1 | | | | | Nb (IR) S |
| Thelopsis rubella | 1 | 1 | 1 | 1 | | S |
| **Totals (Middle Park & Campsite combined total 20)** | **19** | **15** | **15** | **16** | **3** | **29** |

S = SOWI Species

**Acid Bark Woodland Assemblages (*Parmelion laevigatae*)**: distinctive communities developed on well-lit but sheltered acid bark in woodlands in oceanic areas. The best known form (*Parmelietum laevigatae*) is characteristic of old growth high altitude "cloud forest" in very wet areas but a less well known lowland form occurs on lower ground in wet areas and into drier but humid lowland sites (including Community Type M, the *Hypotrachyna laevigata – Loxospora elatina* Community of Ellis et al (2015) described from Scotland and the *Cladonia – Thelotrema lepadinum* Community, Sanderson, (2010) noted in south and south west England). A provisional name could be the *Loxospora elatina – Thelotrema lepadinum* Nodum. In old growth stands this habitat can be very rich in uncommon species and the community appears very sensitive to woodland management. Many species, which are quite mobile in areas with large areas of surviving habitat, can become rare in areas without large undisturbed refugia. In contrast to the Base Rich Bark Woodland Assemblage, this assemblage appears less able to survive on individual veteran trees.

A total of 24 species of conservation interest have been recorded from this habitat from 2019 (**Table 3**), the second richest habitat in the park. The assemblage has a strongly upland element but with some characteristic cloud forest species rare e.g. *Hypotrachyna laevigata*, *Mycoblastus sanguinarius* and *Sphaerophorus globosus* or absent e.g. *Ochrolechia tartarea*. This may be an impact of acidification. Other upland characteristic cloud forest species are present including *Biatora vernalis* (**Map 18**), new to Westmorland, *Bryobilimbia sanguineoatra* (**Map 19**), *Calicium lenticulare* (**Map 20**), new to Westmorland, *Cetrelia cetrarioides* (**Map 22**), *Hypotrachyna taylorensis* (**Map 24**) and *Micarea stipitata*. Strongly south-western species characteristic of more lowland acid bark communities are rare, but *Micarea doliiformis*, new to Westmorland, was locally widespread at Rydal. More generalist species of interest recorded in the habitat included *Anisomeridium ranunculosporum*, *Cladonia caespiticia*, *Cladonia cyathomorpha*, *Loxospora elatina*, *Megalaria pulverea*, *Micarea xanthonica*, *Mycoblastus caesius*, *Parmotrema crinitum*, *Trapelia corticola* and *Thelotrema lepadinum*.

A total of 19 trees were waymarked as supporting at least one of the five systematically recorded species characteristic of this habitat (**Map 6**) in 2019. The wider distribution of most of the species of interest in this assemblage can be seen on **Map 47**. These show the strong development of the habitat in the upper slopes of Middle Park north and the Campsite and the lower slopes of High Park, with reduced diversity high in High Park and in Lower Park. The assemblage of high interest is mainly found in Oak in Lower Park, Middle Park and the Campsite, but is also found on Ash and Alder in High Park.

**TABLE 3**
**Acid Bark Woodland Assemblages**

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | Conservation Status |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Anisomeridium ranunculosporum | | 1 | 1 | 1 | | S |
| Arthrorhaphis aeruginosa | 1 | | 1 | 1 | | Nb (NS) |
| Biatora vernalis | | | | 1 | | Nb (NS) |
| Bryobilimbia sanguineoatra | | | | 1 | | Nb (NS) U |
| Calicium lenticulare | | | 1 | | | Nb (NS/IR) U |
| Cetrelia cetrarioides | 1 | 1 | 1 | 1 | | S, U |
| Cetrelia olivetorum s. str. | 1 | | | | | (NR) |
| Cladonia caespiticia | | | 1 | 1 | | S |
| Cladonia cyathomorpha | 1 | | | | | Nb (NS) |
| Hypotrachyna laevigata | | | | 1 | | U |
| Hypotrachyna taylorensis | | 1 | | 1 | | Nb (IR) U |
| Loxospora elatina | | 1 | | | | S, U |
| Megalaria pulverea | | 1 | 1 | 1 | | U |
| Melaspilea ochrothalamia | | | 1 | | | Nb (NS) |
| Micarea doliiformis | 1 | 1 | 1 | 1 | | Nb (NS) U |
| Micarea stipitata | | | 1 | 1 | | Nb (IR) U |
| Micarea xanthonica | | | 1 | | | Nb (NS/IR) |
| Mycoblastus caesius | | 1 | 1 | | | U |
| Mycoblastus sanguinarius | 1 | | | | | U |
| Parmotrema crinitum | 1 | 1 | | | | S |
| Sphaerophorus globosus | | | | 1 | | U |
| Taeniolella toruloides | | | | 1 | | [NR] |
| Thelotrema lepadinum | | 1 | 1 | 1 | | S |
| Trapelia corticola | | | 1 | 1 | | U |
| **Totals (Middle Park & Campsite combined total 16)** | **7** | **9** | **13** | **15** | **0** | **24** |

S = SOWI Species
U = URI Species

**Mature Mesic Bark Assemblage (*Pertusarietum amarae*)**: found on mature and less acidic bark on the wet side of mature trees in sheltered conditions. The basic community is composed of widespread lichen species, especially *Pertusaria* species including *Pertusaria hymenea*, *Pertusaria pertusa* and *Pertusaria amara* f. *amara* along with *Phlyctis argena*. *Pertusaria flavida* is characteristic of the more species rich variants. This community occurs widely through the countryside on older trees but additional ancient woodland species, or veteran tree specialists, can occur in older woodland stands and in parks. On well-lit bark, the crust forming lichens, dominant on more shaded bark, are partly displaced by leafy "*Parmelia*" species (Well Lit Mature Bark Community, *Parmelietum revolutae*). This latter community is poorer in species of conservation interest.

A total of seven species of conservation interest were recorded from this habitat in 2019 (**Table 4**). The total is lower that the two main habitats of conservation interest but it does include some significant species. Rare species characteristic of the Mature Mesic Bark Assemblage includes south-western forest species, which are absent from Rydal Park, and a well-defined assemblage of southern sub-oceanic species. The latter are a significant feature here. These are characteristic of veteran trees, mainly Oak in well-lit but sheltered locations. They are typical of parklands and woodland edge sites but are absent from deep woodland habitats. The assemblage is likely to have had is core area of distribution in the English midlands but has been largely lost from this area due to acidifying air pollution. The assemblage survives on the fringes of this area where pollution was lowest, especially in eastern central Wales and the Marches (Sanderson, 2014). Many are also rare in continental Europe. Two particular

important species were found at Rydal Park *Caloplaca herbidella* s. str. (**Map 21**) and *Lecanora quercicola* (**Map 25**). The former is now very rare in England and only two trees supporting the species were refound by Sanderson (2014), it having crashed in its main site in Savernake Forest due to increasing shade. In 2019, it was found new to Westmorland, on five Oaks in the north of Lower Park. This is the only known sustainable population known in England at present. *Lecanora quercicola* is also very rare with few recent records from England and only a single recent record from Northern England. This had been recorded by Francis Rose in Rydal Park on Oak in the late 20th century. It was refound on a single giant maiden Oak in Middle Park. Other species found in this habitat are more widespread species but species of interest included *Arthonia vinosa*, *Sphinctrina turbinata* and *Thelotrema lepadinum*. Associated habitats included wound tracks running through the *Pertusarietum* on Sycamore with *Porina byssophila* and *Strigula taylorii*.

**TABLE 4**
**Mature Mesic Bark Assemblage**

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | Conservation Status |
|---|---|---|---|---|---|---|
| Arthonia vinosa | 1 | 1 | 1 | 1 | | S |
| Caloplaca herbidella s. str. | 1 | | | | | VU (NR/S41) |
| Lecanora quercicola | | 1 | | | | VU (NS/IR/S41) S |
| Porina byssophila | 1 | | | 1 | | Nb (NS) |
| Sphinctrina turbinata | 1 | | | | | Nb (NS) |
| Strigula taylorii | | 1 | | | | Nb (NS/IR) |
| Thelotrema lepadinum | | 1 | 1 | 1 | | S |
| **Totals (Middle Park & Campsite combined total 4)** | **4** | **4** | **2** | **3** | **0** | **7** |

S = SOWI Species

A total of six trees were waymarked as supporting one of the two systematically recorded species characteristic of this habitat (**Map 7**) in 2019. The *Pertusarietum* is widespread on Oak and also Sycamore and Ash in the Lower Park, Middle Park and the Campsite, it is poorly developed in the High Park where the bark of mature trees is either too mossy of too acid. The rare sub-oceanic species are much more restricted to the north of Lower Park and Middle Park on veteran Oaks.

**Lignum & Bark Assemblages (*Calicietum abietinae*, *Calicietum hyperelli* & *Cladonietum coniocraeae*)**: a variety of fairly species poor specialist communities develop on bare wood (lignum) and very dry bark. Where large pieces of dead wood or very dry bark on old trees occur, as is typical in old growth stands, uncommon specialist species can occur. The most widespread community is found on damper dead wood and stumps with the lichens *Cladonia* species dominant (Damp Lignum Community (*Cladonietum coniocraeae*)) and crust forming *Trapeliopsis* species. This community is found beyond the old growth stands. This community is not usually of great interest but does support some old woodland species. Two old woodland species were recorded in this habitat: *Cladonia parasitica* was local if widely distributed, while *Imshaugia aleurites* was recorded on a fallen Oak log in the Campsite (**Table 5**).

A more specialist habitat occurs on acid dry wood on vertical surfaces of either standing dead wood or the sides and undersides of very large fallen logs (Dry

Lignum Community (*Calicietum abietinae*)). Rich examples of this habitat were only seen in Middle Park and the Campsite on fallen or partly fallen Oaks and on lignum exposed on ancient Hollies, which supported *Chaenothecopsis nigra*, and *Microcalicium ahlneri*, new to Westmorland, along with *Chaenotheca brunneola*, with only the latter recorded in High Park. Also found in this habitat was *Lecanora strobilina*, new to the north of England, on a fallen Oak in Lower Park, but no details were recorded for this species (**Table 5**).

Finally older Oaks can support species poor communities (Dry Bark Community (*Calicietum hyperelli*)), which include old woodland species on the oldest trees. Lichen interest in this habitat was only found on very old Oaks in the lower part of High Park, where *Chaenotheca brunneola*, *Chaenotheca chrysocephala* and *Chaenotheca trichialis* were found (**Table 6**).

There is limited dead wood in the Lower Park and probably no really old Oaks, but the Middle Park, the Campsite and High Park do have some large piece of dead wood and very old Oaks supporting lichen interest (**Map 8** & **48**).

**TABLE 5**
**Lignum Assemblage**

| **Species** | **Lower Park** | **Middle Park** | **Campsite** | **High Park** | **Nabb Scar** | **Conservation Status** |
|---|---|---|---|---|---|---|
| Chaenotheca brunneola | | | 1 | 1 | | S |
| Chaenothecopsis nigra | | 1 | 1 | | | Nb (NS) S |
| Cladonia parasitica | 1 | 1 | 1 | 1 | | S |
| Imshaugia aleurites | | | 1 | | | P |
| Lecanora strobilina | 1 | | | | | VU (NR) |
| Micarea misella | 1 | | | | | Nb (NS) |
| Microcalicium ahlneri | | 1 | | | | Nb (NS) S |
| **Totals (Middle Park & Campsite combined total 5)** | **3** | **3** | **4** | **2** | **0** | **7** |

S = SOWI Species
P = Boreal Woodland Index Species

**TABLE 6**
**Dry Bark Assemblage**

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | Conservation Status |
|---|---|---|---|---|---|---|
| Chaenotheca brunneola | | | | 1 | | S |
| Chaenotheca chrysocephala | | | | 1 | | S |
| Chaenotheca trichialis | | | | 1 | | S |
| **Totals** | **0** | **0** | **0** | **3** | **0** | |

**Smooth Bark Assemblages (*Graphidion: Graphidetum scriptae* & *Arthpyrenietum punctiformis*)**: communities on smooth bark of shrubs, especially Hazel, Rowan and Holly, and smooth barked trees in sheltered woodland conditions. The basic community is composed of widespread species, especially on young vigorous trees or bushes. On ancient Hazels and Holly, and slow growing suppressed young trees, however, ancient woodland and uncommon species can occur. Several distinct communities occur and in southern Britain these include the *Arthpyrenietum punctiformis* a pioneer community of non-lichenised species occupying the younger branches and the species rich *Graphidetum scriptae* of lichenised species on older stems in better lit and aerated conditions.

At Rydal park common place smooth bark communities were found on Hazel in Lower Park, and only higher up were assemblages of interest found on Hollies in Middle Park, the Campsite and Higher Park, along with some interest on Hazel in Higher Park (**Table 7**) (**Map 9** & **49**). The ancient Holly in both Middle Park and Higher Park is particularly important, with the rare *Mycoporum lacteum* found on three old Hollies, which also support *Mycoporum antecellens*, *Stenocybe septata*, and *Taeniolella toruloides* parasitising *Thelotrema lepadinum*. Hazel is rare in the High Park but includes long undisturbed bushes, which supported *Eopyrenula avellanae* and *Porina byssophila*, both new to Westmorland.

**TABLE 7**
**Smooth Bark Communities**

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | Conservation Status |
|---|---|---|---|---|---|---|
| Eopyrenula avellanae | | | | 1 | | Nb (NS/IR) |
| Mycoporum antecellens | | 1 | | | | S |
| Mycoporum lacteum | | 1 | | 1 | | NT (NS) |
| Phaeographis inusta | | | | 1 | | Nb (NS/IR) S |
| Porina borreri | | 1 | | | | Nb (NS) |
| Porina byssophila | | | | 1 | | Nb (NS) |
| Stenocybe septata | | | 1 | | | Nb (IR) S |
| Taeniolella toruloides | | | | 1 | | [NR] |
| Thelotrema lepadinum | | 1 | 1 | 1 | | S |
| **Totals (Middle Park & Campsite combined total 4)** | **0** | **4** | **2** | **6** | **0** | **9** |

**Other Habitats**: other habitats contribute a great deal to the species diversity of the site, but have few species of conservation interest. In particular these include the canopy communities on twigs and branches, and other trunk communities not described above. There are, however, many under recorded species, which were new to Westmorland (**Species List 1**) such as *Lecanora hybocarpa*. The impressive lichenicolous fungus assemblage recorded by Vince Giavarini, in particular

contributed numerous new vice-county records. One twig species *Caloplaca asserigena* Nb (NS) is regarded as a notable species. In addition, the twig assemblages are a good guide to the current level of air pollution, as they have not been influenced by different past air pollution concentrations. Oak twigs were intensively recorded in three locations, two in the Lower Park and one in the lower section of High Park. The taxa recorded are listed below in **Table 8**. To analysis this, the six most nitrogen tolerant lichens (in the authors opinion) were scored 1 and the six most nitrogen sensitive lichens were scored -1, to give a comparable score.

**TABLE 8**
**Canopy Assemblages recorded on Selected Branches**

| Species | LP N | LP S | UP | N Tolerance |
|---|---|---|---|---|
| Caloplaca asserigena | | 1 | | |
| Candelariella xanthostigmoides | | | 1 | N |
| Evernia prunastri | 1 | 1 | 1 | A |
| Flavoparmelia caperata | | 1 | 1 | |
| Fuscidea lightfootii | 1 | 1 | 1 | |
| Graphis elegans | | | 1 | |
| Homostegia piggotii | 1 | | | |
| Hypogymnia physodes | 1 | | | A |
| Hypogymnia tubulosa | | 1 | 1 | A |
| Hypotrachyna afrorevoluta | 1 | | 1 | |
| Hypotrachyna revoluta s. str. | 1 | 1 | | |
| Illosporiopsis christiansenii | | 1 | | |
| Lecanora chlarotera | 1 | | | |
| Lecanora hybocarpa | | 1 | | |
| Lecanora pulicaris | | | 1 | A |
| Marchandiomyces corallinus | | | 1 | |
| Melanelixia subaurifera | | | 1 | |
| Melanohalea elegantula | | 1 | | |
| Melanohalea exasperatula | | 1 | | N |
| Parmelia saxatilis | | | 1 | |
| Parmelia sulcata | 1 | 1 | 1 | |
| Physcia aipolia | 1 | 1 | | N |
| Physcia tenella | 1 | 1 | | N |
| Platismatia glauca | | | 1 | A |
| Pronectria oligospora | | 1 | | |
| Punctelia jeckeri | 1 | 1 | R | |
| Ramalina farinacea | 1 | | R | N |
| Rinodina sophodes | | 1 | | |
| Usnea subfloridana | | | 1 | A |
| Xanthoria parietina | 1 | 1 | | N |
| **Total taxa** | **13** | **17** | **16** | |
| **Comparative score** | **2** | **2** | **-3** | |

LP N: Lower Park north, one sweeping Oak branch, NY368 058
LP S: Lower Park south, recent fallen Oak branch, NY37080581
UP: High Park, accessible twigs on old Oak, NY3686 0658
N: nitrogen tolerant lichens
A: nitrogen sensitive lichens

The APIS website gives the background ammonia concentrations as 0.59µg $m^3$, well below the critical level for lichens as 1.0µg $m^3$ and the acid deposition above the critical load for the habitat. This matches the data from High Park collected from an Oak in lightly grazed pasture woodland with unimproved grassland. There are very few nitrogen tolerant species here. Where they occurred they were associated with wounds on the twigs. In the Lower Park, the sward is improved but has reverted to permanent pasture in the north but looks more productive and more fertilised to the south. The latter appeared to be expressed in the greater prominence of nitrogen tolerant lichens to the south, but this is not shown in the comparative score; if real this would need more sampling to confirm. The assemblage in the Lower Park has more nitrogen tolerant species than the Higher Park sample and fewer nitrogen sensitive lichens but sensitive species such as *Evernia prunastri* and *Hypogymnia physodes* are still present. Also very nitrogen tolerant species such as *Xanthoria parietina* are rare and confined to damaged or dead twigs.

The assemblage in Lower Park does not indicate very high ammonia levels but does indicate mild enrichment that would be expected in a lowland park.

The rocks also add to the lichen diversity, but the rock assemblage is an ordinary one of siliceous rocks, and lacks any species of special interest.

# 4.0 NATURE CONSERVATION VALUE AND MANAGEMENT

## 4.1 Nature Conservation Value

### 4.1.1 Value of Lichen Assemblage

The parkland scores 34 using the Southern Oceanic Woodland Index (SOWI) for the 2019 data. The threshold for SSSI quality in this index in this area is 20 (Sanderson et al, 2018), **so the SOWI score is well over this threshold**. It also scores 14 in the **Upland Rainforest Index (URI), so also above the regional threshold for SSSI quality**, which is 10 for this area. The combined Middle Park and the Campsite area and High Park also both pass the SSSI thresholds individually (**Table 9**). The Pinhead Index is high, but just fails to reach the threshold of 10.

**TABLE 9**
**Indices Scores & Numbers of Selectable Species, Rydal Park, 2019**

| Species | Lower Park | Middle Park & Campsite | High Park | Rydal Park |
|---|---|---|---|---|
| SOWI Index Scores | 16 | **28** | **21** | **34** |
| URI Index Scores | 4 | **10** | **10** | **14** |
| Pinhead Index | 4 | 5 | 4 | 9 |
| SSSI Criteria spp | **5** | **3** | **1** | **7** |

Lower Park does not pass the thresholds in both indices; however, Rydal Park also supports many species of conservation interest in their own right, many of which are found in Lower Park, including the highest number of SSSI criteria species. These are listed below (LP = Lower Park, MP/C = Middle Park & the Campsite, UP = Upper Park, • = Section 41 species, Red = independent SSSI criteria species):

**Woodland Epiphyte Assemblage:**

**Four Vulnerable species:**

| Species | Status | LP | MP/C | HP |
|---|---|---|---|---|
| *Bacidia subincompta* • | NS | | | 1 |
| *Caloplaca herbidella s. str.* • | NR | 1 | | |
| *Lecanora quercicola* • | NS/IR | | 1 | |
| *Lecanora strobilina* | NR | 1 | | |
| **Total number VU species** | | **2** | **1** | **1** |

**Four Near Threatened species:**

| Species | Status | LP | MP/C | HP |
|---|---|---|---|---|
| *Agonimia octospora* | NS/IR | | 1 | |
| *Gyalecta flotowii* | NS | | | 1 |
| *Mycoporum lacteum* | NS | | 1 | 1 |
| *Ramonia dictyospora* • | NS/IR | 1 | | |
| *Rinodina isidioides* • | NS/IR | 1 | 1 | |
| **Total number NT species** | | **2** | **3** | **1** |

**32 Notable species:**

| Species | Status | LP | MP/C | HP |
|---|---|---|---|---|
| *Agonimia flabelliformis* | NR | | 1 | |
| *Arthrorhaphis aeruginosa* | NS | 1 | 1 | 1 |
| *Biatora vernalis* | NS | | | 1 |
| *Bryobilimbia sanguineoatra* | NS | | | 1 |

| | | | | |
|---|---|---|---|---|
| *Calicium lenticulare* | NS/IR | | 1 | |
| *Caloplaca asserigena* | NS | 1 | | |
| *Chaenothecopsis nigra* | NS | | 1 | |
| *Cladonia cyathomorpha* | NS | 1 | | |
| *Eopyrenula avellanae* | NS/IR | | | 1 |
| *Hypotrachyna taylorensis* | IR | | 1 | 1 |

**Notable species continued:**

| **Species** | **Status** | **LP** | **MP/C** | **HP** |
|---|---|---|---|---|
| *Leptogium subtile* | NS | | | 1 |
| *Lobaria pulmonaria* | IR | 1 | 1 | |
| *Lobaria virens* | IR | | 1 | |
| *Melaspilea ochrothalamia* | NS | | 1 | |
| *Micarea doliiformis* | NS | 1 | 1 | 1 |
| *Micarea stipitata* | IR | | 1 | 1 |
| *Micarea xanthonica* | NS/IR | | 1 | |
| *Microcalicium ahlneri* | NS | | 1 | |
| *Pannaria conoplea* | IR | 1 | 1 | 1 |
| *Parmeliella parvula* | IR | | 1 | |
| *Parmeliella triptophylla* | IR | | 1 | 1 |
| *Peltigera collina* | IR | 1 | | |
| *Phaeographis inusta* | NS/IR | | | 1 |
| *Phyllopsora rosei* | NS/IR | 1 | 1 | 1 |
| *Porina borreri* | NS | 1 | | 1 |
| *Porina byssophila* | NS | 1 | | 1 |
| *Rinodina griseosoralifera* | NS | 1 | | |
| *Rinodina roboris* var. *roboris* | IR | 1 | 1 | 1 |
| *Sphinctrina turbinata* | NS | 1 | | |
| *Stenocybe septata* | IR | | 1 | |
| *Sticta limbata* | IR | 1 | | |
| *Strigula taylorii* | NS/IR | | 1 | |
| **Total number Notable species** | | **14** | **19** | **15** |

This is a rich epiphytic assemblage of Threatened, Near Threatened and Notable species and gives an epiphytic TNTN score of 58. TNTN scoring is not used for woodland SSSI selection, however, **seven of the epiphytic species recorded in 2019 could be assessed as having populations that qualify for SSSI site selection in their own right as Threatened lichens in Britain**. These are either Vulnerable or higher threatened species *(Bacidia subincompta*, *Caloplaca herbidella* s. str., *Lecanora quercicola* & *Lecanora strobilina*), or Near Threatened species that are International Responsibility species (*Agonimia octospora*, *Ramonia dictyospora* & *Rinodina isidioides*). Rydal park is in the south of National Character Area "8 Cumbria High Fells". This Area of Search (AoS), is rich in lichen sites of international importance, most of which have not been systematically surveyed recently, and determining which species could be selectable under the criteria would require detailed research on past records and reports and probably new field survey data. From the data available ***Caloplaca herbidella* s. str., as the largest known population in England**, certainly qualifies, while ***Lecanora quercicola*, *Ramonia dictyospora* and *Rinodina isidioides* are the largest known, or only extant populations in the AoS**. The records of *Agonimia octospora* and *Bacidia subincompta*, are significant in the AoS but it would need more data to assess their status within the AoS. *Lecanora strobilina* is potentially actually a data deficient species and it is not possible to confidently assess the importance of the 2019 find.

**Rydal Park is an important site of international significance for epiphytic lichens**. This interest is associated with the veteran trees in parkland and pasture wood. The interest includes well developed **Base Rich Bark Woodland Assemblages** (*Lobarion pulmonariae* & *Agonimion octosporae*) throughout and **Acid Bark Woodland Assemblages** (*Parmelion laevigatae*) higher up. Very significant species also occur in *Mature Mesic Bark Assemblage* (*Pertusarietum amarae*) in the Lower Park while **Lignum**

& **Bark Assemblages** (*Calicietum abietinae* & *Calicietum hyperelli*) and **Smooth Bark Assemblages** (*Graphidetum scriptae*) add to the diversity in the mid slope habitats.

### 4.1.2 Distribution of Interest

The distribution of interest recorded in 2019 is shown on **Map 4**. The interest is greatest in the mid slopes, where upland and lowland habitat overlap, but the Lower Park has exceptionally rich individual trees. The highest woods are badly impacted by acid rain and mists, but still have rich communities on some veteran Ash.

## 4.2 Management

### 4.2.1 Management Requirements of Woodland and Parkland Lichen Floras

The best conditions for woodland lichen assemblages are typically found in extensively grazed pasture woodland with a mixture of open high forest, glades and savannah like stands (Sanderson & Wolseley, 2001). The main positive features appear to be:

- Many trees surviving to senescence.
- Varying, but generally good light levels (with different lichen species having widely different tolerances).
- Shelter producing humid conditions.
- Slow woodland dynamics.

The basic mechanism driving this is a varying browsing pressure on tree regeneration that suppresses regeneration for long periods. A major interaction is between the shrub layer and the browsers; this can rapidly and drastically change the light and humidity levels without immediately altering the canopy layer (Coppins & Coppins 1998). Interactions between browsers and the canopy are much more long term, but frequent glades are required. Glades need to be dynamic but permanent features and slow dynamics are crucial. Coppins & Coppins (2002b), as an initial guide, suggest a requirement for at least 30% glades within the canopy of lichen rich woodlands and that the glades have a permanence of at least 30 years. In contrast, tree cover of less than 20 to 30% will result in the loss of woodland conditions and the resultant loss of the old growth dependent woodland lichen assemblages. Exceptions to the latter are found in parklands with veteran trees with wide spreading crowns in very sheltered valley bottoms or humid areas. In very wet oceanic areas, woodland conditions can also be maintained with less shelter and in more open areas. In these special conditions woodland lichen assemblages can survive in more open conditions.

There is no reason why such conditions could not be created by management outside of pasture woodlands, but this would not be easy. In particular, it is important to appreciate the scale of management required. Rare lichens typically have very low rates of occupation, as they require specialised niches found on only a few veteran trees. As a result, they tend to occur on very small numbers of trees within large populations of veteran trees. Each veteran tree will have different combinations of niches. Rather than just maintaining a few especially rich trees, sustainable management requires the maintenance of good conditions around dozens or hundreds of trees (depending of the size of the site), both veteran and maturing. To

imitate browsing impacts fully, management would also be required to be annual. For example, without browsing, coppice regrowth around haloed veteran trees (trees with shrubs and maturing trees cut from around them) can cast a very dense shade on the lower trunks within three years or so. Extensive grazing appears to be the only practical method of maintaining large blocks of nationally or internationally important lichen rich woodland in the long term. Suitable conditions are unlikely to be found in woodlands managed efficiently for timber. Neither are they likely to be found within true non-intervention woodland with low browsing levels.

Parkland is an artificial habitat that maintains conditions similar to those found in the more open parts of pasture woodlands. The main difference is that natural regeneration is unlikely to occur and new generations of trees need to be provided by tree planting. Alternatively, parks could be rewilded and managed more extensively to allow natural regeneration. The latter would often be beneficial for lichens but would usually be in conflict with the preservation of designed landscapes. As well as woodland lichen assemblages, parklands can also provide a refuge for lichens of old field and wayside trees that were once much more widespread in the general countryside.

Parks are more likely to be negatively impacted by agricultural intensification and the resultant ammonia pollution than woodlands. Extensive grassland management with no or minimal fertiliser applications is required. Parks brought into arable production in the 20th century should be put back to permanent grassland. Parks are much more likely than woodlands to suffer from tree generation gaps. In most parks, little tree planting occurred between the agricultural depression of the 1870s and the 1960s. In parks with particularly serious generation gaps simply planting trees now with not solve the problem; many of the current veteran trees will be lost before the planted trees are old enough to be colonised by rare lichen species. In these situations, there may be solutions involving land adjacent to the surviving open parkland. There was often tree planting in adjacent woods during the gap in parkland planting and mature 19th century Oak in adjacent habitats could be promoted as new veteran trees to bridge the gap. In many parks there has also been a tendency to fence off denser areas of veteran trees and patches of pasture woodland with the wider parks over the 19th and 20th centuries. Ideally conserving or restoring the lichen interest of such areas would involve thinning any dense post enclosure regeneration away from older trees, removing fences, and restoring grazing.

In heavily grazed parks individual trees of groves are sometimes fenced off to prevent direct damage to the trees from the stock. Ideally the grazing intensity should be reduced rather than fencing off the trees. If trees must be fenced off, then it is absolutely essential that the grazing be replaced with grass cutting, scrub control and Ivy control to maintain the parkland conditions around the lower trunks.

### 4.2.2 Comments on Management of Rydal Park

The current structure of the parkland and pasture woodland is in good condition for the lichen assemblage. The most significant current or potential damaging impacts are from external threats such as acid rain and Ash dieback. Some long term adjustments of the management would, however, be beneficial:

**Lower Park**:

- Reduce the intensity of the grassland management, including stopping any fertiliser applications, with a long-term aim of developing more herb-rich permanent pasture.
- Carry out some tree planting, especially Oak and Sycamore, to allow very long-term replacements for the existing veteran trees.
- In the future retain dead wood as it develops. Ideally leave fallen trees where they fall, especially if they fall and stay propped of the ground, as this is a more valuable lichen habitat.

**Middle Park**:

- To allow very long-term replacements for the existing veteran trees, either plant some trees, including Oak, Holly and Sycamore or long-term varying of the grazing pressure somewhat to allow patchy regeneration.
- In the future retain dead wood as it develops. Ideally leave fallen trees where they fall, especially if they fall and stay propped of the ground, as this is a more valuable lichen habitat.

**The Campsite**:

- Carry out some tree planting, especially Oak and Sycamore, to allow very long term replacements for the existing veteran trees.
- In the future retain dead wood as it develops, where possible.

**High Park**:

- This pasture woodland is in very good condition but will need long-term variations in the grazing pressure somewhat to allow patchy regeneration.

### 4.2.3 External Factors at Rydal Park – Acid Rain

Acid rain has had a serious impact, especially higher up, and the site is still modelled as being in exceedance for acid deposition by the APIS website. Acid deposition has been declining and long term recovery should occur as long as national policy to reduce pollution is maintained. Nitrogen air pollution from agriculture, however, is not decreasing to the extent that sulphur pollution has, and long distant dispersal from this source contributes to acidification. This may slow down recovery unless this is tackled as effectively as industrial and transport sources of acidifying pollution have been (Plantlife, 2017).

### 4.2.4 External Factors at Rydal Park – Ash Dieback

The impact of Chalara (*Hymenoscyphus pseudoalbidus*) Ash Dieback disease on Ash trees and the associated lichen assemblages is not yet clear. Information on the potential impact of Ash epiphytic lichens assemblages can be found at the BLS website <www.britishlichensociety.org.uk/about-lichens/habitats-conservation/ash-chalara-dieback-and-lichens>. The rapid loss of younger sub-canopy Ash trees seems inevitable but some older Ash trees are likely to survive for decades. Reported deaths of older Ash appear to be mainly from secondary infections such as honey fungus, presumably due to stress. Some tolerance in Ash is

reported but at low levels. Possible management responses in lichen rich stands have been summarised by Sanderson & Lamacraft (in press).

Ash is locally very significant in High Park, especially the highest woodland where all trees of high interest are Ash. In this case Ash Dieback will seriously impact the interest of the site, but will leave the lower woodland and parkland still of high interest. The threatened species include both leafy and some crust forming species. A leafy species particularly potentially impacted is *Pannaria conoplea* Nb (IR), with more than 50% of the recorded populations on Ash, while the crustose species *Bacidia subincompta* VU (NS/S41) and *Mycobilimbia pilularis* were only found on single Ash trees. Other species have significant occurrences on Ash, of two leafy lichens *Cetrelia cetrarioides* and *Hypotrachyna taylorensis* Nb (IR) with 50% of their records on Ash. Other species have some occurrence on Ash but have less than 50% of their occurrence on Ash: *Parmeliella triptophylla* Nb (IR), *Phyllopsora rosei* Nb (NS/IR), *Rinodina roboris* var. *roboris* Nb (IR), and *Rinodina isidioides* NT (NS/IR/S41).

As with much of the Lake District, mitigation will be difficult here as the main faster maturing shrubs suitable for colonisation, Sallow and Hazel are too acidified to support these species. Translocation of leafy lichens to base rich Oak and Sycamore lower down in the wood may be the only short-term mitigation measure.

In the long-term, promoting any Ash Dieback tolerant regeneration of Ash or planting tolerant Ash will allow the recovery of veteran Ash in the landscape in 200 years' time.

# 5.0 REFERENCES

Alexander, K. N. A., Smith, M., Stiven & Sanderson, N. A. (2002) *English Nature research Reports No 494. Defining 'Old Growth' in the UK Context*. Peterborough: English Nature.

Coppins, A. M. & Coppins, B. J. (1998) *Lichen Survey of Horner Woods NNR – 1998*. Unpublished Report to the National Trust.

Coppins A. M. & Coppins, B. J. (2002a) *Indices of Ecological Continuity for Woodland Epiphytic Lichen Habitats in the British Isles*. London: British Lichen Society.

Coppins A. M. & Coppins, B. J. (2002b) *Watersmeet SSSI (Part of Exmoor & Quantocks cSAC) Lichen Survey in the Hoaroak Water, Farley Water & East Lyn River March 2002*. An unpublished report to English Nature.

Ellis, C. J., Eaton, S., Theodoropoulos, M. and Elliott, K. (2015) *Epiphyte Communities and Indicator Species: An Ecological Guide for Scotland's Woodlands*. Edinburgh: Royal Botanic Garden.

Fritz, Ö. (2009) Vertical distribution of epiphytic bryophytes and lichens emphasizes the importance of old beeches in conservation. *Biodivers. Conser.* **18**: 289–304

Harding, P. T. & Alexander, K. N. A. (1993) The saproxylic invertebrates of historic parklands: progress and problems. In: *Dead Wood Matters: the Ecology and Conservation of Saproxylic invertebrates in Britain* (ed. K. J. Kirby & C. M. Drake) 58 – 73. Peterborough: English Nature.

Hodgetts, N. G. (1992) *Guidelines for Selection of Biological SSSIs: Non-Vascular Plants*. Peterborough: JNCC.

James, P. W., Hawksworth, D. & Rose, F. (1977) Lichen communities in the British Isles: A preliminary conspectus. In: *Lichen Ecology* (ed. M. R. D., Seaward) 295-413.

Milligan, K. & Preston, D. (2018) *Rydal Park Veteran Tree Survey 2018*. A report for Natural England.

Plantlife (2017) *We Need to Talk About Nitrogen*. Salisbury; Plantlife

Rose, F. (1976) Lichenological indicators of age and environmental continuity in woodlands. In: *Lichenology: Progress and Problems* (eds: D H Brown, D L Hawksworth & R H Bailey) 279-307

Rose, F. (1992) Temperate forest management: its effects on bryophytes and lichen floras and habitats. In: *Bryophytes and Lichens in a Changing Environment*. (eds: J W Bates & A M Farmer) 211-233. Oxford: Oxford University Press.

Sanderson, N. A. (2010) Chapter 9 Lichens. In: *Biodiversity in the New Forest* (ed. A. C. Newton) 84-111. Newbury, Berkshire; Pisces Publications

Sanderson, N. A. (2011) Scoring of threatened, rare and scarce lichens for site assessment. *British Lichen Society Bulletin*. **109**: 12-24.

Sanderson (2014) *Geranium Firedot* Caloplaca herbidella *Dossier: Survey of Sites 2012 to 2014*. A report by Botanical Survey & Assessment to Plantlife International.

Sanderson, N. A. (in press a) *A review of woodland epiphytic lichen habitat quality indices in the UK*. A report by Botanical Survey and Assessment for Natural England.

Sanderson, N. A. (in press b) *The development of TNTN lichen assemblage scoring*. A report by Botanical Survey and Assessment for Natural England.

Sanderson, N. A. and Lamacraft, D. (in press) *Impacts of* Hymenoscyphus *(*Chalara*) Ash Dieback on priority lichens and the potential for mitigation*. A report for Natural England by Botanical Survey and Assessment (Hampshire) and Plantlife (Salisbury), UK.

Sanderson, N. A. Wilkins, T., Bosanquet, S. & Genney, D. (2018) *Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 13 Lichens and associated microfungi*. Joint Nature Conservation Committee 2018: Peterborough <jncc.defra.gov.uk/page-2303>

Sanderson, N. A. & Wolseley, P. (2001). Management of pasture woodlands for lichens. In: *Habitat Management for Lichens*. (ed. A. Fletcher) 05-1 – 05-25. London: British Lichen Society.

Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James P.W. & Wolseley. P. A. (2009) *The Lichens of Great Britain and Ireland*. London: British Lichen Society.

Wolseley, P. A., James, P. A., Theobald, M. R. & Sutton, M. A. (2006) Detecting Changes in epiphytic lichen communities at sites effected by atmospheric ammonia from agricultural sources. *The Lichenologist*. **38**: 161-176.

Woods, R. G. & Coppins, B. J. (2012) *Species Status No. 13 A Conservation Evaluation of British Lichens and Lichenicolous Fungi*. Peterborough: JNCC.

# ANNEX 1 Field Notes

**Key**:

**General**
Coll. = Collected to confirm identity. Herb. = Collected specimen retained in author's herbarium. fr. = fertile.

**Substrates**
Al = Alder, Ap = Sycamore, Bt = Birch, Cf = Conifer, Co = Hazel, Cs = Sweet Chestnut, Fg = Beech, Fx = Ash, Ix = Holly, Lx = Larch, P = Pine, Q = Oak, Sb = Rowan, Ug = Wych Elm, L = Lignum (as prefix), Tw = twigs & branches, WT = Worked Timber, SS = Siliceous rock, XBw = Boundary wall, Terr = Terricolous.

**Hosts for lichenicolous fungi**
Z0408 = *Cladonia polydactyla* var. *polydactyla*, Z0511 = *Evernia prunastri*, Z0533 = *Graphis scripta*, Z0578 = *Hypocenomyce scalaris*, Z0582 = *Hypogymnia physodes*, Z0614 = *Lecania cyrtellina*, Z0639 = *Lecanora chlarotera,* Z0643 = *Lecanora conizaeoides* f. *conizaeoides*, Z0820 = *Lepraria incana* s. lat., Z0987 = *Flavoparmelia caperata*, Z0988 = *Xanthoparmelia conspersa*, Z0997 = *Melanelixia glabratula*, Z1015 = *Parmelia saxatilis*, Z1020 = *Melanelixia subaurifera*, Z1042 = *Peltigera horizontalis*, Z1043 = *Peltigera hymenina*, Z1076 = *Pertusaria hymenea*, Z1079 = *Pertusaria leioplaca*, Z1087 = *Pertusaria pertusa*, Z1113 = *Physcia aipolia*, Z1120 = *Physcia tenella*, Z1410 = *Thelotrema lepadinum*, Z1530 = *Xanthoria parietina*, Z1629 = *Lepraria finkii*, Z2070 = *Punctelia subrudecta* s. str., Z2468 = *Hypotrachyna afrorevoluta*

**Species in bold** = systematically recorded species

The field notes made by Neil Sanderson are reproduced below, along with additional records and notes from other recorders.

## A1 Rydal Park BLS Survey 4/9/2019

### A1.1 Weather
It had rained heavily the day before and the tree bark was still wet but drying. Remained dry but overcast.

### A1.2 Campsite
Before the meeting time Neil started in the campsite where he was staying in a camping pod.

**NY3606**

**NY368 063**
Two good Sessile Oaks by the camping pod

**RDN001** (NY36832 06363, 84m): post-mature Sessile Oak on edge of parkland grove

| | | |
|---|---|---|
| ***Rinodina isidioides*** | Q | O |
| ***Thelopsis rubella*** | Q | F |
| **Also** | | |
| *Bacidia biatorina* | Q | |
| *Lopadium disciforme* | Q | |
| *Pachyphiale carneola* | Q | |

**Other Species**

| | |
|---|---|
| *Ochrolechia subviridis* | Q |
| *Pertusaria hymenea* | Q |
| *Phlyctis argena* | Q |

**Photo 2019-09-04-01**

**RDN002** (NY36811 06355, 79m): post-mature Sessile Oak on edge of parkland grove

| | | |
|---|---|---|
| ***Phyllopsora rosei*** | Q | R |
| ***Rinodina isidioides*** | Q | R |

Also

| | |
|---|---|
| *Bacidia biatorina* | Q |
| *Agonimia flabelliformis* | Q |

**Photo 2019-09-04-01**

**Photo 2019-09-04-01**: **Trees RDN001** (right) **& RDN002** (left): two post-mature Oaks by the camping pod, with ***Rinodina isidioides*** and ***Thelopsis rubella*** on both trees and *Phyllopsora rosei* and *Agonimia flabelliformis* on RDN002.

**NY368 063**

**Species of Interest**

| | |
|---|---|
| *Agonimia flabelliformis* | Q |
| *Bacidia biatorina* | Q |
| *Lepraria membranacea* | Q |
| *Lopadium disciforme* | Q |
| *Pachyphiale carneola* | Q |
| *Phyllopsora rosei* | Q |
| *Rinodina isidioides* | Q |
| *Thelopsis rubella* | Q |

**Other Species**

| | |
|---|---|
| *Cladonia fimbriata* | Q |
| *Normandina pulchella* | Q |

| | |
|---|---|
| *Ochrolechia subviridis* | Q |
| *Pertusaria hymenea* | Q |
| *Phlyctis argena* | Q |
| *Pyrrhospora quernea* | Q |

**NY367 063**
By stream by camping pods

**Species of Interest**

| | |
|---|---|
| *Peltigera horizontalis* | LFg |

**Other Species**

| | |
|---|---|
| *Peltigera membranacea* | LFg |

**NY367 064**
Upstream and to east of stream

**RDN004** (NY36733 06407, 83m): post-mature Sessile Oak in open in Campsite

| | | |
|---|---|---|
| ***Cetrelia cetrarioides*** | Q | F |
| ***Parmeliella parvula*** | Q | A |
| ***Rinodina isidioides*** | Q | O |

Also

| | |
|---|---|
| *Arthonia vinosa* | Q |
| *Bacidia biatorina* | Q |
| *Lopadium disciforme* | Q |
| *Thelotrema lepadinum* | Q |

**NY367 064**
**Species of Interest**

| | |
|---|---|
| *Anisomeridium ranunculosporum* | Ix |
| *Arthonia vinosa* | Q |
| *Cetrelia cetrarioides* | Q |
| *Melaspilea ochrothalamia* | Ix |
| *Parmeliella parvula* | Q |
| *Stenocybe septata* | Ix |
| *Thelotrema lepadinum* | Ix, Q |

**Other Species**

| | |
|---|---|
| *Bacidia rubella* | Q |
| *Flavoparmelia caperata* | Q |
| *Graphis elegans* | Ix |
| *Melanelixia glabratula* | Q |
| *Ochrolechia androgyna* | Q |
| *Varicellaria hemisphaerica* | Q |

**NY368 064**
Big Sessile Oak by stream

**RDN003** (NY36801 06432, 88m): big post-mature Sessile Oak by glade by stream

| | | |
|---|---|---|
| ***Agonimia octospora*** | Q | O |
| ***Parmeliella triptophylla*** | Q | O |
| ***Thelopsis rubella*** | Q | F |

Also

| | |
|---|---|
| *Lopadium disciforme* | Q |
| *Mycobilimbia epixanthoides* | Q |
| *Mycobilimbia pilularis* | Q |
| *Peltigera horizontalis* | Q |

**NY3667 0641**
Sycamore by campsite block

| | |
|---|---|
| *Collema flaccidum* | Ap |

**A1.3 Lower Park, Northern Field**
Joined the main party and started surveying the Lower Park

**NY367 062**
Lower Park with fairly productive looking permanent pasture with scattered veteran tree and groves. The oldest trees appeared to be ancient and post-mature former inbye boundary trees, with younger generations of planted between to create the parkland. A mature sycamore was looked at first.

**NY367 062**
**Other Species**

| | | |
|---|---|---|
| *Arthonia radiata* | Ap | |
| *Lichenodiplis pertusariicola* | Ap, Z1087 | New to Westmorland |
| *Lecanora chlarotera* | Ap | Coll. Crystals confined to the epithecium |
| *Normandina pulchella* | Ap | |
| *Opegrapha varia* | Ap | Coll. Spores more than 5µm wide, seven septate |
| *Pertusaria hymenea* | Ap | |
| *Pertusaria pertusa* | Ap | |
| *Porina aenea* | Ap | |
| *Pseudoschismatomma rufescens* | Ap | |

Vince Giavarini added

**NY36755 06214** [amended from NY36755 061214]

| | | |
|---|---|---|
| *Vouauxiella verrucosa* | Ap, Z0639 | On *Lecanora chlarotera*. New to Westmorland |

Steve Price added species from a Hawthorn by river

**NY3675 0621**
**Other Species**

| | |
|---|---|
| *Arthonia radiata* | Ct |
| *Arthopyrenia analepta* | Ct |
| *Lecidella elaeochroma* f. *elaeochroma* | Ct |
| *Physcia aipolia* | Ct |

**NY367 061**
The first trees of interest were veteran Oaks recorded by a side stream.

**RDN005** (NY36767 06193, 62m): ancient Sessile Oak in Park

| | | |
|---|---|---|
| ***Cetrelia cetrarioides*** | Q | R |

**RDN006** (NY36748 06186, 60m): post-mature Sessile Oak by side stream

| | | |
|---|---|---|
| ***Caloplaca herbidella* s. str.** | Q | O |
| Also | | |
| *Pachyphiale carneola* | Q | |
| *Pertusaria flavida* | Q | |

**NY367 061**

**Species of Interest**

| | |
|---|---|
| *Bacidia biatorina* | Q |
| *Caloplaca herbidella* s. str. | Q |
| *Cetrelia cetrarioides* | Q |
| *Micarea doliiformis* | Q |
| *Pachyphiale carneola* | Q |

**Other Species**

| | |
|---|---|
| *Amandinea punctata* | Q |
| *Arthonia spadicea* | Q |
| *Bacidia rubella* | Q |
| *Flavoparmelia caperata* | Q |
| *Melanelixia glabratula* | Q |
| *Ochrolechia subviridis* | Q |
| *Pertusaria flavida* | Q |
| *Pertusaria hymenea* | Q |
| *Pertusaria pertusa* | Q |
| *Phaeophyscia orbicularis* | Q |
| *Varicellaria hemisphaerica* | Q |

Brian Coppins added:

**NY3676 0618**

**Other Species**

| | |
|---|---|
| *Caloplaca obscurella* | Q |
| *Evernia prunastri* | Q |
| *Hyperphyscia adglutinata* | Q |
| *Lepraria incana s. str.* | Q |
| *Physcia aipolia* | Q, Tw |
| *Physcia tenella* | Q, Tw |
| *Ramalina farinacea* | Q, Tw |

Steve Price added

**NY367 061**

**Other Species**

| | |
|---|---|
| *Fuscidea lightfootii* | Q, Lx |
| *Hypogymnia tubulosa* | Lx |
| *Hypotrachyna afrorevoluta* | Lx |
| *Normandina pulchella* | Q |
| *Parmelia saxatilis* s. lat. | Lx |
| *Parmelia sulcata* | Q |
| *Parmotrema perlatum* | Q |
| *Pertusaria albescens* var. *albescens* | Q |

| | | |
|---|---|---|
| *Physconia distorta* | Q | |
| *Punctelia jeckeri* | Q | |
| *Pyrrhospora quernea* | Q | |

**NY366 060**
A group of exceptionally rich veteran Oaks along the Rydal Beck

**RDN007** (NY36676 06079, 51m): ancient Sessile Oak by Rydal Beck

| | | |
|---|---|---|
| ***Caloplaca herbidella* s. str.** | Q | A |
| ***Cetrelia cetrarioides*** | Q | |
| ***Thelopsis rubella*** | Q | |
| Also | | |
| *Cladonia cyathomorpha* | Q | |
| *Lecanora chlarotera* | Q | Coll. Crystals confined to the epithecium, soluble in K |
| *Pertusaria flavida* | Q | |

**RDN008** (NY36674 06077, 49m): ancient Sessile Oak by Rydal Beck

| | | |
|---|---|---|
| ***Caloplaca herbidella* s. str.** | Q | F |
| ***Cetrelia cetrarioides*** | Q | F |
| ***Lobaria pulmonaria*** | Q | O |
| ***Pannaria conoplea*** | Q | F |
| ***Peltigera collina*** | Q | O |
| ***Rinodina roboris var. roboris*** | Q | R |
| ***Sticta limbata*** | Q | F |
| ***Thelopsis rubella*** | Q | O |
| Also | | |
| *Aquacida viridifarinosa* | Q | |
| *Bacidia biatorina* | Q | |
| *Cladonia pyxidata* | Q | |
| *Mycobilimbia epixanthoides* | Q | |

**Photos** 2019-09-04-02 & 3


**Photo 2019-09-04-02** & **3**: **Tree RDN008**: an ancient Sessile Oak by Rydal Beck, probably a boundary Oak predating the creation of the Lower Park out of outbye land. A very rich tree with ***Caloplaca herbidella* s. str.**, ***Cetrelia cetrarioides***, ***Lobaria pulmonaria***, ***Pannaria conoplea***, ***Peltigera collina***, ***Rinodina roboris* var. *roboris***, ***Sticta limbata*** and ***Thelopsis rubella***. The left hand picture shows the well-developed ***Sticta limbata*** colony.

**RDN009** (NY36675 06032, 49m): ancient Sessile Oak by the Rydal Beck

| | | |
|---|---|---|
| ***Phyllopsora rosei*** | Q | F |
| ***Rinodina isidioides*** | Q | R |
| Also | | |
| *Bacidia biatorina* | Q | |
| *Lopadium disciforme* | Q | |

**NY3666 0609**: during the 27/03/2019 reconnaissance, D. Lamacraft & A. Windle of Plantlife collected an odd *Catinaria* from this group of Oaks. This is a taxa known only previously from the New Forest, which has an apothecia similar to *Catinaria atropurpurea*, but with larger spores (16 – 18 x 7 – 8µm) and a distinctive isidiate thallus, resembling *Bacidia biatorina*, but with algae 7 – 9µm and spherical (*Dictyochloropsis*) and the grey-green more coralloid isidia swell and become bright green when wet. This appears to be an undescribed taxa (herbarium name *Catinaria* "isidioides"). The specimen was examined and retained by Neil Sanderson (Herb. Sanderson 2708) **Photos** 2019-09-04-11 – 16.

**Photos 2019-09-04-11 – 15**: **Tree RDN007 or RDN008**: *Catinaria* "isidioides", specimen Herb. Sanderson 2708, an undescribed *Catinaria* species, showing the black apothecia and isidiate thallus. Wet thalli to the right and dry to the left, the isidia swelling and becoming bright green when wet.

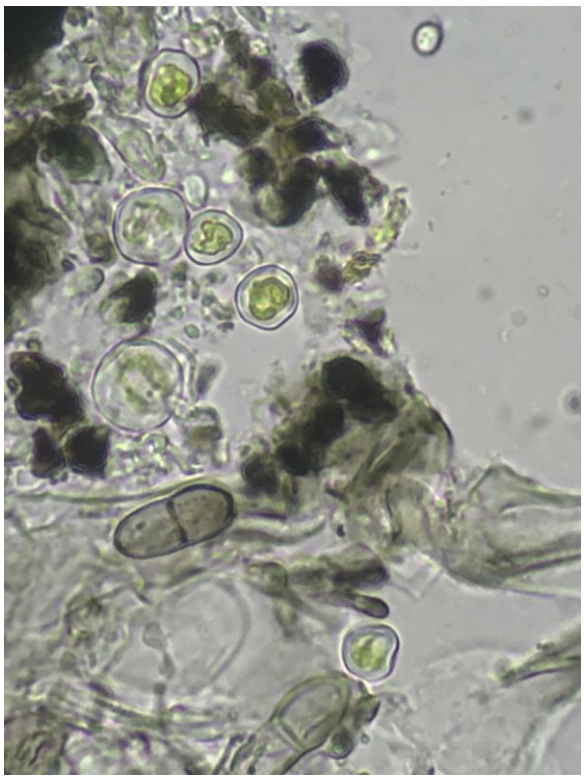


**Photo 2019-09-04-16**: **Tree RDN007 or RDN008**: *Catinaria* "isidioides", specimen Herb. Sanderson 2708, showing large spores, larger than those of *Catinaria atropurpurea*, and the *Dictyochloropsis* algae.

**NY366 060**

| **Species of Interest** | | |
|---|---|---|
| *Bacidia biatorina* | Q | |
| *Caloplaca herbidella* s. str. | Q | |
| *Cetrelia cetrarioides* | Q | |
| *Cladonia cyathomorpha* | Q | |
| *Lobaria pulmonaria* | Q | |
| *Lopadium disciforme* | Q | |
| *Pannaria conoplea* | Q | |
| *Peltigera collina* | Q | |
| *Phyllopsora rosei* | Q | |
| *Rinodina isidioides* | Q | |
| *Rinodina roboris* var. *roboris* | Q | |
| *Sticta limbata* | Q | F |
| *Thelopsis rubella* | Q | |
| **Other Species** | | |
| *Aquacida viridifarinosa* | Q | |
| *Cladonia coniocraea* | Q | |
| *Cladonia pyxidata* | Q | |
| *Cyrtidula quercus* | Q Tw | |
| *Flavoparmelia caperata* | Q | |
| *Ochrolechia androgyna* | Q | |
| *Parmelia saxatilis* | Q | |
| *Pertusaria flavida* | Q | |
| *Pertusaria leioplaca* | Q Tw | |

Vince Giavarini added:

**NY36678 06087**

| | | |
|---|---|---|
| *Lichenodiplis pertusariicola* | Ap, Z1078 | On *Pertusaria hymenea* by Rydal Beck |

**NY36674 06077**

| | | |
|---|---|---|
| *Paranectria oropensis* subsp. *oropensis* | Q, Z1629 | On *Lepraria finkii* by the Rydal Beck. New to Westmorland |
| *Pronectria pertusariicola* | Fx, Z1087 | On *Pertusaria pertusa* by the Rydal Beck. New to Westmorland |

Brian Coppins added:

**NY3667 0606**

| | |
|---|---|
| **Species of Interest** | |
| *Mycobilimbia epixanthoides* | Q |
| **Other Species** | |
| *Bacidia rubella* | Q |
| *Candelariella reflexa* | Q Tw |
| *Hypogymnia tubulosa* | Q Tw |
| *Hypotrachyna afrorevoluta* | Q |
| *Melanelixia subaurifera* | Q Tw |
| *Ochrolechia subviridis* | Q |
| *Punctelia subrudecta* s. str. | Q Tw |

**NY3667 0608**

| | |
|---|---|
| **Other Species** | |
| *Melanohalea elegantula* | Q Tw |

**NY366060**

Corylus by river

| | |
|---|---|
| **Other Species** | |
| *Arthonia punctiformis* | Co |
| *Arthonia radiata* | Co |
| *Graphis scripta* | Co, Z1079 |
| *Marchandiomyces corallinus* | Co |
| *Pertusaria leioplaca* | Co |

**NY3605**

Moving south to a knoll, mainly planted in younger post-mature trees. On the north side significant interest had colonised some of the younger veteran Oaks. This was much less so further south.

**NY367 059**

**RDN010** (NY36784 05938, 50m): post-mature Sessile Oak at base of knoll in parkland

| | |
|---|---|
| ***Rinodina isidioides*** | Q |
| ***Thelopsis rubella*** | Q |

Also

| | | |
|---|---|---|
| *Amandinea punctata* | Q | Coll. Brown one septate spores greater than 10µm long |
| *Lecanora argentata* | Q | Coll. No crystals in the epithecium |
| *Lopadium disciforme* | Q | |
| *Pachyphiale carneola* | Q | |

Brian Coppins added to this tree (NY3678 0593)

| | |
|---|---|
| ***Caloplaca herbidella* s. str**. | Q |

Also

| | |
|---|---|
| *Pachyphiale carneola* | Q |

Dave Lamacraft added:

**RDD002**: (NY36791 05921, 60m): Sycamore in parkland

| | |
|---|---|
| ***Thelopsis rubella*** | Ap |

Also

| | |
|---|---|
| *Bacidia rubella* | Ap |

NY3673 0596 Ap with *Lecania cyrtellina* Z0614 with *Phaeospora parasitica* Coll. Herb. DL [ID'd using Hawksworth, Atienza & Coppins 2010]

**NY367 059**

**Species of Interest**

| | | |
|---|---|---|
| *Caloplaca herbidella* s. str. | Q | BJC |
| *Dactylospora parasitica* | Q, Z1076 | VG noted on three trees |
| *Lopadium disciforme* | Q | |
| *Pachyphiale carneola* | Q | |
| *Rinodina isidioides* | Q | |
| *Thelopsis rubella* | Q, Ap | |

**Other Species**

| | | |
|---|---|---|
| *Amandinea punctata* | Q | |
| *Anisomeridium polypori* | Ap | |
| *Bacidia rubella* | Q, Ap | |
| *Intralichen christiansenii* | Ap, Z0614 | Coll. Herb. Sanderson2655. Brown one septate conidia formed on end of chains 7 x 4µm. Det. Nichola Bacciu. New to Westmorland |
| *Lecania cyrtellina* | Ap | |
| *Lecanora argentata* | Q | |
| *Lecanora expallens* | Q | |
| *Normandina pulchella* | Ap | |
| *Opegrapha atra* | Q | |
| *Opegrapha vulgata* | Ap | |
| *Parmelia saxatilis* | Q | |
| *Pertusaria hymenea* | Q | |
| *Phaeospora parasitica* | Ap, Z0614 | |
| *Xanthoria parietina* | Ap | |

Vince Giavarini added:

**Species of Interest**
*Sphinctrina turbinata* Fx, Z1087
**Other Species**
*Pertusaria pertusa* Fx

Brain Coppins added:

Sycamore in corner of field, nr river
**Species of Interest**
*Porina byssophila* Ap New to Westmorland
**Other Species**
*Arthonia radiata* Ap
*Opegrapha niveoatra* Ap

**NY36780 593**
*Lecanora chlarotera* Q
*Ochrolechia androgyna* Q
*Pyrrhospora quernea* Q
*Varicellaria hemisphaerica* Q
*Vouauxiella lichenicola* Q, Z0639 New to Westmorland

**NY368 059**

**RDN011** (NY36810 05959, 50m): post-mature Sessile Oak in Park
***Caloplaca herbidella s. str.*** Q R
***Ramonia dictyospora*** Q R Det N Bacciu New to Westmorland
***Rinodina griseosoralifera*** Q A New to Westmorland & NW England
Also
*Lopadium disciforme* Q

**RDN012** (NY36844 05996, 52m): ancient Ash in parkland
***Cetrelia cetrarioides*** Fx
Also
*Lecanora hybocarpa* Fx Coll. Thalline margin Pd –; disk lightly pruinose; Lecanora pulicaris type epithecium, with crystals extending down into hymenium. New to Westmorland
*Leptogium teretiusculum* Fx
See other Ash records below, including those of Vince Giavarini & Brian Coppins

**NY368 059**
**Species of Interest**
*Cetrelia cetrarioides* Fx
*Caloplaca herbidella s. str.* Q
*Bacidia biatorina* Q
*Lopadium disciforme* Q
*Leptogium teretiusculum* Fx
*Mycoblastus sanguinarius* Q

| | |
|---|---|
| *Parmotrema crinitum* | Q |
| *Ramonia dictyospora* | Q |
| *Rinodina griseosoralifera* | Q |
| **Other Species** | |
| *Abrothallus microspermus* | Q, Z0987 |
| *Agonimia tristicula* | Fx |
| *Arthonia vinosa* | Q |
| *Caloplaca ulcerosa* | Fx |
| *Cladonia polydactyla* var. *polydactyla* | Lx |
| *Dimerella pineti* | Q |
| *Flavoparmelia caperata* | Fx, Q |
| *Hypocenomyce scalaris* | Lx |
| *Hypogymnia physodes* | Lx |
| *Lecanora hybocarpa* | Fx |
| *Lecidella elaeochroma* f. *elaeochroma* | Fx |
| *Marchandiomyces corallinus* | Lx, Z1015 |
| *Melanelixia glabratula* | Fx, Lx |
| *Ochrolechia subviridis* | Fx fr |
| *Opegrapha vulgata* | Fx |
| *Parmelia saxatilis* | Fx, Lx |
| *Parmeliopsis ambigua* | Lx |
| *Pertusaria amara* f. *amara* | Q |
| *Platismatia glauca* | Lx |
| *Thelenella muscorum* var. *mu*scorum | Fx |

Vince Giavarini added
**NY36847 05988**

| | | |
|---|---|---|
| *Homostegia piggotii* | Fx, Z1015 | On *Parmelia saxatilis* |

Vince Giavarini added 06/09/19
**NY368 059**

| | | |
|---|---|---|
| *Lichenochora obscuroides* | Q, Z1113 | On *Physcia aipolia*. New to Westmorland |
| *Lichenoconium erodens* | Q, Z0511 | On *Evernia prunastri* |

Brian Coppins added
**NY3684 0598**

| | |
|---|---|
| *Pertusaria hymenea* | Fx |
| *Ramalina farinacea* | Fx |

Steve Price added

**NY3684 0595**

| | |
|---|---|
| *Normandina pulchella* | Q |

**NY3681 0592**
**Species of Interest**

| | |
|---|---|
| Arthonia vinosa | Q |

**Species of Interest**

| | |
|---|---|
| Lecanora expallens | Q |
| Pertusaria flavida | Q |

**NY368 058**
Also on the knoll, but with the interest declining, carried out a survey of an Oak branch here

**NY368 058**
**Species of Interest**

| | | |
|---|---|---|
| *Arthonia vinosa* | Q | |
| *Micarea doliiformis* | Q | |

**Other Species**

| | | |
|---|---|---|
| *Abrothallus bertianus* | Q, Z0997 | |
| *Calicium glaucellum* | Q | |
| *Cladonia cryptochlorophaea* | Q | KC + Purple |
| *Trapeliopsis flexuosa* | LQ | |

One Oak branch:

| | | |
|---|---|---|
| *Evernia prunastri* | Q Tw | |
| *Fuscidea lightfootii* | Q Tw | |
| *Homostegia piggotii* | Q Tw, Z1015 | |
| *Hypogymnia physodes* | Q Tw | |
| *Hypotrachyna afrorevoluta* | Q Tw | |
| *Hypotrachyna revoluta* s. str. | Q Tw | |
| *Lecanora chlarotera* | Q Tw | |
| *Parmelia sulcata* | Q Tw | |
| *Physcia aipolia* | Q Tw | |
| *Physcia tenella* | Q Tw | R |
| *Punctelia jeckeri* | Q Tw | |
| *Ramalina farinacea* | Q Tw | |
| *Xanthoria parietina* | Q Tw | Dead twig |

Added by Vince Giavarini from rock outcrop within parkland:

**NY36871 05838**

| | | |
|---|---|---|
| *Abrothallus caerulescens* | SS, Z0988 | New to Westmorland |
| *Xanthoparmelia conspersa* | SS | |

Added by Brian Coppins

**NY3681 0589**

| | | |
|---|---|---|
| *Porina borreri* | Fg | New to Westmorland |

Steve Price added:

Trees
**NY3682 0582**

| | |
|---|---|
| *Cladonia digitata* | LQ |
| *Melanohalea laciniatula* | Q |
| *Platismatia glauca* | Q |
| *Punctelia subrudecta* s. str. | Q |
| *Usnea wasmuthii* | Q Tw |

Outcrop

**NY3687 0582**

| | |
|---|---|
| *Baeomyces rufus* | SS |
| *Candelariella vitellina* f. *vitellina* | SS |
| *Cladonia subcervicornis* | Terr, SS |
| *Lecanora polytropa* | SS |
| *Ochrolechia androgyna* | SS |
| *Pertusaria aspergilla* | SS |
| *Pertusaria corallina* | SS |
| *Trapelia glebulosa* | SS |
| *Trapeliopsis pseudogranulosa* | Terr, SS |
| *Varicellaria lactea* | SS |

**NY3683 0583**

| | |
|---|---|
| *Cladonia polydactyla* var. *polydactyla* | Q |
| *Ochrolechia androgyna* | Q |
| *Pertusaria amara* f. *amara* | Q |

**NY3684 0582**

Boulder in parkland

**Other Species**

| | |
|---|---|
| *Aspicilia caesiocinerea* | SS |
| *Candelariella coralliza* | SS |
| *Lasallia pustulata* | SS |
| *Parmelia saxatilis* s. lat. | SS |
| *Rhizocarpon geographicum* | SS |
| *Xanthoparmelia conspersa* | SS |

Stump in parkland

**Species of Interest**

| | |
|---|---|
| *Cladonia parasitica* | LQ |

**Other Species**

| | |
|---|---|
| *Cladonia digitata* | LQ |
| *Micarea leprosula* | LQ |
| *Micarea lignaria* var. *lignaria* | LQ |
| *Trapeliopsis flexuosa* | LQ |
| *Trapeliopsis granulosa* | LQ |

**NY3684 0581**

Rails of a tree guard

| | |
|---|---|
| *Hypogymnia tubulosa* | WT |
| *Hypotrachyna revoluta* s. str. | WT |
| *Melanelixia subaurifera* | WT |
| *Micarea coppinsii* | WT |
| *Micarea lignaria* var. *lignaria* | WT |
| *Parmelia saxatilis* s. lat. | WT |
| *Parmelia sulcata* | WT |
| *Violella fucata* | WT |

**NY368 058**

**Species of Interest**

| | |
|---|---|
| *Arthrorhaphis aeruginosa* | LQ, Cladonia sp |

**Other Species**

| | |
|---|---|
| *Calicium viride* | Q |
| *Cladonia ramulosa* | LQ |
| *Melanohalea elegantula* | Q, Tw |
| *Pertusaria pertusa* | Q |
| *Physcia tenella* | Q, Tw |
| *Physconia enteroxantha* | Q |
| *Trapeliopsis pseudogranulosa* | LQ |

**NY367 058**
South side of knoll

**NY367 058**
**Other Species**

| | |
|---|---|
| *Arthonia radiata* | Sb |
| *Cladonia diversa* | LQ |
| *Cladonia floerkeana* | LQ |
| *Cladonia ochrochlora* | LQ |
| *Hypocenomyce scalaris* | Q |
| *Lecidella elaeochroma* f. *elaeochroma* | Sb |
| *Micarea viridileprosa* | Q |
| *Parmelina pastillifera* | Fg Tw |

Dave Lamacraft added:

**NY36776 05894**
**Species of Interest**

| | |
|---|---|
| *Bacidia biatorina* | Q |
| *Pachyphiale carneola* | Q |

**Other Species**

| | |
|---|---|
| *Bacidia rubella* | Q |
| *Lecanora compallens* | Q |

### A1.3 Lower Park, Southern Field

This has lusher pasture and appears more fertilised, with higher numbers of nitrogen demanding lichens recorded on the trees.

**NY368 058**
The north west corner on field, some big trees but limited interest, enriched by concentrations of animals.

**NY368 058**
**Species of Interest**

| | |
|---|---|
| *Bacidia biatorina* | Q |

**Other Species**

| | |
|---|---|
| *Calicium viride* | Q |
| *Evernia prunastri* | Q |
| *Melanohalea elegantula* | Q Tw |
| *Physcia adscendens* | Q |
| *Physconia grisea* | Q |
| *Ramalina farinacea* | Q |

| | |
|---|---|
| *Xanthoria parietina* | Q |

**NY368 057**
The north west corner on field.

**NY368 057**
**Species of Interest**

| | |
|---|---|
| *Bacidia biatorina* | Q |
| *Leptogium teretiusculum* | Q |

**Other Species**

| | |
|---|---|
| *Amandinea punctata* | Q |
| *Arthonia spadicea* | Q |
| *Punctelia subrudecta* s. str. | Q |

**NY3705**

**NY370 058**
North east of field, veteran trees but limited interest. Fallen branch of Oak surveyed

Recorded by Brain Coppins

**RDB001** (NY3707 0580): Oak in parkland, 70m

| | | |
|---|---|---|
| ***Cetrelia cetrarioides*** | Q | Medulla C– |

**NY370 058**
**Species of Interest**

| | | |
|---|---|---|
| *Cetrelia cetrarioides* | Q | BJC |

**Other Species**

| | |
|---|---|
| *Chrysothrix flavovirens* | Cs |
| *Cladonia digitata* | Cs |
| *Cladonia polydactyla* var. *polydactyla* | Cs |
| *Hypocenomyce scalaris* | Cs |
| *Pertusaria coccodes* | Q |

**Recent fallen Oak branch at NY37080581**

| | | |
|---|---|---|
| *Caloplaca asserigena* | Q Tw | Added by N. Bacciu |
| *Evernia prunastri* | Q Tw | |
| *Flavoparmelia caperata* | Q Tw | |
| *Fuscidea lightfootii* | Q Tw | |
| *Hypogymnia tubulosa* | Q Tw | |
| *Hypotrachyna revoluta* s. str. | Q Tw | |
| *Illosporiopsis christiansenii* | Q Tw | Z1120 |
| *Lecanora hybocarpa* | Q Tw | Coll. Thalline margin Pd –; disk lightly pruinose; *Lecanora pulicaris* type epithecium, with crystals extending down into hymenium. Herb. Sanderson 2653. New to Westmorland. NY37089 05813 |
| *Melanohalea elegantula* | Q Tw | |
| *Melanohalea exasperatula* | Q Tw | |
| *Parmelia sulcata* | Q Tw | |
| *Physcia aipolia* | Q Tw | |

| | | |
|---|---|---|
| *Physcia tenella* | Q Tw | |
| *Pronectria oligospora* | Q Tw, Z2070 | |
| *Punctelia jeckeri* | Q Tw | |
| *Rinodina sophodes* | Q Tw | Coll. |
| *Xanthoria parietina* | Q Tw | |

Added by Brian Coppins

**NY37070580**

| | | |
|---|---|---|
| *Abrothallus microspermus* | Q, Z0987 | |
| *Amandinea punctata* | Q | |
| *Flavoparmelia caperata* | Q | |
| *Melanelixia glabratula* | Q | |
| *Ochrolechia subviridis* | Q | |
| *Parmelia saxatilis* s. lat. | Q | |
| *Parmelia sulcata* | Q | |
| *Pertusaria albescens* var. *corallina* | Q | |

**NY3708 0582**

| | | |
|---|---|---|
| *Evernia prunastri* | CQ | |
| *Lichenoconium erodens* | CQ,Z1022 | On moribund *Parmelia sulcata* |
| *Parmelia sulcata* | CQ | |
| *Phlyctis argena* | CQ | |

**NY370 058**

| | | |
|---|---|---|
| *Chrysothrix flavovirens* | Ae | |
| *Cladonia digitata* | Ae | |
| *Cladonia polydactyla* var. *polydactyla* | Ae | |
| *Hypocenomyce scalaris* | Ae | |
| *Parmelia saxatilis* s. lat. | Ae | |
| *Parmelia sulcata* | Ae | |

**NY369 061**

On the way back, Dave Lamacraft looked at the north east of the northern field and recorded one significant Ash tree

**RDD003** (NY36906 06119, 60m): veteran Ash tree on edge of grove in parkland

| | | |
|---|---|---|
| ***Rinodina isidioides*** | Fx | Nice streak on S side |
| Also | | |
| *Ochrolechia subviridis* | Fx | |

### A1.3 Lower Park, Allan Pentecost's Records

Allan Pentecost recorded a useful list from the Lower Park, but did only recorded on a 1km grid square basis, including some species not seen by others.

**SU3705:**

| | |
|---|---|
| *Amandinea punctata* | |
| *Anisomeridium polypori* | C |
| *Arthonia spadicea* | F |
| *Candelariella reflexa* | |

| | |
|---|---|
| *Cetrelia olivetorum* s. str. | Several trees, KC + pink. (not seen by others or tested with UV, but most likely to be *Cetrelia olivetorum* s. str., which has an old record for Westmorland). |
| *Cladonia polydactyla* | C on stumps |
| *Graphis scripta* | (Some recorded as *G. pulverulenta*) |
| *Hypotrachyna revoluta* | |
| *Hypotrachyna taylorensis* | |
| *Hypotrachyna afrorevoluta* | |
| *Lecanora carpinea* | Ash Tw |
| *Lecanora conizaeoides* | |
| *Lecanora strobilina* | lignum on fallen Oak |
| *Lepraria membranacea* | |
| *Leptogium teretiusculum* | widespread |
| *Micarea lignaria* | |
| *Micarea misella* | Fallen Oak branch |
| *Micarea peliocarpa* | |
| *Micarea prasina* s. lat. | widespread |
| *Opegrapha atra* | |
| *Opegrapha varia* | |
| *Pachyphiale carneola* | F on oak |
| *Parmelina pastillifera* | Ash trunk |
| *Parmotrema crinitum* | |
| *Physcia tenella* | |
| *Physcia aipolia* | |
| *Platismatia glauca* | |
| *Porina aenea* | |
| [*Porina chlorotica* | C, possibly *Porina byssophila*?, not counted as not otherwise reported from park on any habitat] |
| *Punctelia jeckeri* | |
| *Punctelia subrudecta* s. str. | |
| *Trapeliopsis granulosa* | |
| *Trapeliopsis pseudogranulosa* | |
| *Xanthoparmelia conspersa* | Ash trunk |
| *Xanthoria parietina* | |
| *Xanthoria polycarpa* | |

**SU3606**
Oaks etc below Hall, outside the area of search but inside the lower park ecologically

| | |
|---|---|
| *Agonimia tristicula* | |
| *Buellia schaereri* | Abies bark |
| *Chrysothrix candelaris* | Abies |
| *Collema flaccidum* | |
| *Leptogium teretiusculum* | |
| *Pannaria conoplea* | |
| *Peltigera horizontalis* | |
| *Peltigera praetextata* | |
| *Rinodina isidioides* | |
| *Thelopsis rubella* | |

### A1.4 Middle Park

Above the old public road and probably formerly an outbye pasture woodland integral with the upper park, but latter developed as part of the landscape park. Sward is unimproved acid grassland (U4) with flushes (M23a). Scattered veteran Oak and Holly along with old Alder. Lichen interest increases to the north west. The lichen interest in the campsite appears to be an extension of this interest.

**NY3705**

**NY372 058**

Visited by Dave Lamacraft, recording a rich Oak further south east than reached by Neil Sanderson.

**RDD001** (NY37239 05837, 90m): veteran Oak in unimproved parkland

| | | | |
|---|---|---|---|
| ***Agonimia octospora*** | Q | O | In rain track with ***Lobaria pulmonaria*** (confirmed NAS) |
| ***Lobaria pulmonaria*** | Q | O | One good patch 50 x5 0cm SW side |
| ***Rinodina roboris*** | Q | A | In streak on SW side |
| Also | | | |
| *Cliostomum griffithii* | Q | | |
| *Melanelixia glabratula* | Q | | |
| *Micarea doliiformis* | Q | On nw and e side | |
| *Pachyphiale carneola* | Q | R | Nw side |
| *Pertusaria albescens* | | | |
| *Schismatomma decolorans* | Q | R | S side |
| *Thelotrema lepadinum* | Q | R | |
| *Varicellaria hemisphaerica* | Q | O | S side in flush above Lp |

**NY371 059**

Ancient hollow Ash at base of slope

**NY371 059**

**Species of Interest**

| | | |
|---|---|---|
| *Leptogium lichenoides* | Fx | |
| *Parmeliopsis hyperopta* | LQ | Fallen log |
| *Peltigera horizontalis* | Fx | |

**Other Species**

| | |
|---|---|
| *Abrothallus microspermus* | Al Tw, Z0987 |
| *Bacidia rubella* | Fx, LFx |
| *Cladonia polydactyla* var. *polydactyla* | Al |
| *Flavoparmelia caperata* | Al |
| *Flavoparmelia caperata* | Al Tw |
| *Fuscidea lightfootii* | Al Tw |
| *Hypogymnia physodes* | Al Tw |
| *Hypotrachyna afrorevoluta* | Al Tw |
| *Melanelixia glabratula* | Al, Fg |
| *Opegrapha vulgata* | Fx |
| *Parmelia saxatilis* | Al |
| *Parmotrema perlatum* | Al Tw |
| *Pertusaria hymenea* | Fx |

| | |
|---|---|
| *Phlyctis argena* | Fg |
| *Platismatia glauca* | Al Tw |
| *Pseudoschismatomma rufescens* | Fx |
| *Punctelia jeckeri* | Al Tw |
| *Stenocybe pullatula* | Al Tw |

On the 06/09/19 Vince Giavarini added:

**NY37100 05934**

| | | |
|---|---|---|
| *Scutula epiblastematica* | Fx, Z1042 | On huge pollarded ash by park road on *Peltigera horizontalis*. New to Northern England & third British record |
| *Marchandiomyces corallinus* | Q, Fx, Co, Z1015, Z1113 | On *Parmelia saxatilis* & *Physcia aipolia* |

**NY3706**

**NY370 060**

A trackside Oak was recorded by Brain Coppins along with a Sycamore and Alder

**NY370 060**

| | |
|---|---|
| **Species of Interest** | |
| *Arthonia vinosa* | Q |
| *Bacidia biatorina* | Q |
| *Strigula taylorii* | Ap |
| **Other Species** | |
| *Lecanora expallens* | Q |
| *Melanelixia glabratula* | Q |
| *Melanohalea elegantula* | Ap Tw |
| *Normandina pulchella* | Q |
| *Pertusaria pertusa* | Q |
| *Ramalina farinacea* | Ap Tw |
| *Stenocybe pullatula* | Al Tw |
| *Xanthoria parietina* | Ap Tw |

Steve Price added:

**NY3707 0601**

| | |
|---|---|
| *Anisomeridium polypori* | Fx |

**NY371 060**

| | | |
|---|---|---|
| **Species of Interest** | | |
| *Bacidia biatorina* | Q | |
| *Cladonia parasitica* | LIx | NY3710 0608 |
| *Parmotrema crinitum* | Q | NY3711 0605 |
| **Other Species** | | |
| *Amandinea punctata* | Q | |
| *Buellia griseovirens* | LQ | |
| *Cladonia coniocraea* | LQ | |
| *Cladonia polydactyla* var. *polydactyla* | LQ | |

| | |
|---|---|
| *Evernia prunastri* | Q |
| *Flavoparmelia caperata* | Q Tw, Q |
| *Lecidella elaeochroma* f. *elaeochroma* | Q |
| *Melanelixia glabratula* | Q |
| *Melanohalea elegantula* | Q Tw |
| *Ochrolechia subviridis* | Q |
| *Parmelia saxatilis* | Q Tw, Q |
| *Pertusaria flavida* | Q |
| *Pertusaria hymenea* | Q |
| *Trapeliopsis flexuosa* | LQ |
| *Trapeliopsis granulosa* | LQ |
| *Varicellaria hemisphaerica* | Q |

**NY370 061**
A scatter of ancient Hollies with significant lichen interest in mid slope

**RDN013** (NY37074 06148, 112m): ancient Holly on slope in quite open situation

| | | | |
|---|---|---|---|
| ***Chaenothecopsis nigra*** | LIx | R | Coll. One septate, septa thicker than cell wall |
| ***Mycoporum lacteum*** | Ix | F | |
| Also | | | |
| *Anisomeridium ranunculosporum* | Ix | | |
| *Bacidia biatorina* | Ix | | |
| *Enterographa crassa* | Ix | | |
| *Thelotrema lepadinum* | Ix | | |

**RDN014** (NY37064 06161, 112m): ancient Holly on slope in quite open situation

| | | |
|---|---|---|
| ***Mycoporum lacteum*** | Ix | F |
| Also | | |
| *Anisomeridium ranunculosporum* | Ix | |
| *Thelotrema lepadinum* | Ix | |

**NY370 061**
**Species of Interest**

| | | |
|---|---|---|
| *Anisomeridium ranunculosporum* | Ix | |
| *Bacidia biatorina* | Q, Ix | |
| *Chaenothecopsis nigra* | LIx | |
| *Lopadium disciforme* | Q | |
| *Mycobilimbia epixanthoides* | Q | NY3708 0612 |
| *Mycoporum lacteum* | Ix | |
| *Thelotrema lepadinum* | Ix | |

**Other Species**

| | |
|---|---|
| *Arthonia radiata* | Ix |
| *Bacidia biatorina* | Ix |
| *Enterographa crassa* | Ix |
| *Graphis elegans* | Ix |
| *Normandina pulchella* | Q |
| *Opegrapha atra* | Ix |
| *Opegrapha vulgata* | Ix |
| *Pertusaria albescens* var. *corallina* | Q |
| *Pyrrhospora quernea* | Ix |

**NY370 062**
More old Holly and a very important huge maiden Oak, presumably predating the park.

**RDN015** (NY37008 06205, 100m): post-mature Sessile Oak in unimproved parkland 5.31m girth

| | | |
|---|---|---|
| ***Lecanora quercicola*** | Q | R 1 thalli photographed, second 10cm below, possible third, fourth to right |
| ***Rinodina isidioides*** | Q | R |

Also

| | |
|---|---|
| *Arthonia vinosa* | Q |
| *Micarea doliiformis* | Q |
| *Thelotrema lepadinum* | Q |

**Photos** 2019-09-04-07 – 9

**Photos 2019-09-04-08 – 09**: **Tree RDN015**: a post-mature Sessile Oak in unimproved parkland 5.31m girth, with ***Lecanora quercicola*** and ***Rinodina isidioides***. One ***Lecanora quercicola*** thalli was photographed just below the blue pin, there was second 10cm below, a possible third near this and a fourth to the right

**Photos 2019-09-04-10**: **Tree RDN015**: a post-mature Sessile Oak in unimproved parkland, a large tree 5.31m girth, with ***Lecanora quercicola*** and ***Rinodina isidioides***.

**NY370 062**
**Species of Interest**

| | | |
|---|---|---|
| *Arthonia vinosa* | Q | |
| *Bacidia biatorina* | Q | |
| *Lecanora quercicola* | Q | |
| *Micarea doliiformis* | Q | |
| *Mycoporum antecellens* | Ix | |
| *Rinodina isidioides* | Q | |
| *Thelotrema lepadinum* | Ix, Q | |

**Other Species**

| | | |
|---|---|---|
| *Anisomeridium biforme* | Ix | Coll. pycnidia only |
| *Pertusaria leioplaca* | Ix | |
| *Varicellaria hemisphaerica* | Q | |
| *Pyrrhospora quernea* | Q | |
| *Ochrolechia androgyna* | Q | |
| *Cliostomum griffithii* | Q | |
| *Pyrrhospora quernea* | Q | |

**NY3606**
Interest on scattered old trees continues

**NY369 060**
Steve Price recorded a boulder in this area

**NY36910609**

| | | |
|---|---|---|
| *Cladonia diversa* | SS | |
| *Pertusaria corallina* | SS | |
| *Sclerococcum sphaerale* | SS, Z1066 | On *Pertusaria corallina* |

**NY369 062**

**RDN017** (NY36993 06227, 79m): fallen dead Oak

| | | |
|---|---|---|
| ***Microcalicium ahlneri*** | LQ | New to Westmorland |

**NY369 062**
**Species of Interest**

| | |
|---|---|
| *Anisomeridium ranunculosporum* | Q |
| *Bacidia biatorina* | Q |
| *Loxospora elatina* | Q |
| *Megalaria pulverea* | Q |
| *Micarea doliiformis* | Q |
| *Microcalicium ahlneri* | LQ |
| *Mycoblastus caesius* | Q |
| *Thelotrema lepadinum* | Q |

**Other Species**

| | |
|---|---|
| *Arthonia spadicea* | Q |
| *Chrysothrix candelaris* | Q |
| *Chrysothrix flavovirens* | Q, LQ |
| *Hypocenomyce scalaris* | Q |
| *Lecanora expallens* | Q |

| | | |
|---|---|---|
| *Micarea peliocarpa* | LQ | Coll. |
| *Pertusaria amara* f. *amara* | Q | |
| *Phlyctis argena* | Q | |

**NY368 063**
A rich old Oak near the campsite

**RDN016** (NY36993 06227, 79m): big post-mature Sessile Oak in parkland

| | | | |
|---|---|---|---|
| ***Lobaria pulmonaria*** | Q | O | high up |
| ***Pannaria conoplea*** | Q | R | |
| ***Parmeliella triptophylla*** | Q | O | high up |
| ***Rinodina isidioides*** | Q | O | |
| ***Rinodina roboris* var. *roboris*** | Q | O | |
| ***Thelopsis rubella*** | Q | O | |
| **Also** | | | |
| *Agonimia tristicula* | Q | | |
| *Bacidia rubella* | Q | | |
| *Gyalecta truncigena* | Q | Coll. | |

**Photo** 2019-09-04-10

**Photos 2019-09-04-11**: **Tree RDN016**: a very rich post-mature Sessile Oak in unimproved parkland, a large tree 5.31m girth, with ***Lobaria pulmonaria*** (high up), ***Pannaria conoplea***, ***Parmeliella triptophylla*** (high up), ***Rinodina isidioides***, ***Rinodina roboris* var. *roboris*** and ***Thelopsis rubella***.

## A2 Rydal Park BLS Survey 5/9/2019

### A2.1 Weather

A dry day with the tree bark now dried out.

### A2.2 Middle Park

Neil made an early morning visit to upper slope of the west of Middle Park. This had herb rich U4 with nice M23a flushes, with an important Sycamore with two *Lobaria* species, with more acid bark interest appearing. Including ***Hypotrachyna taylorensis***.

**NY3606**

**NY369 063**

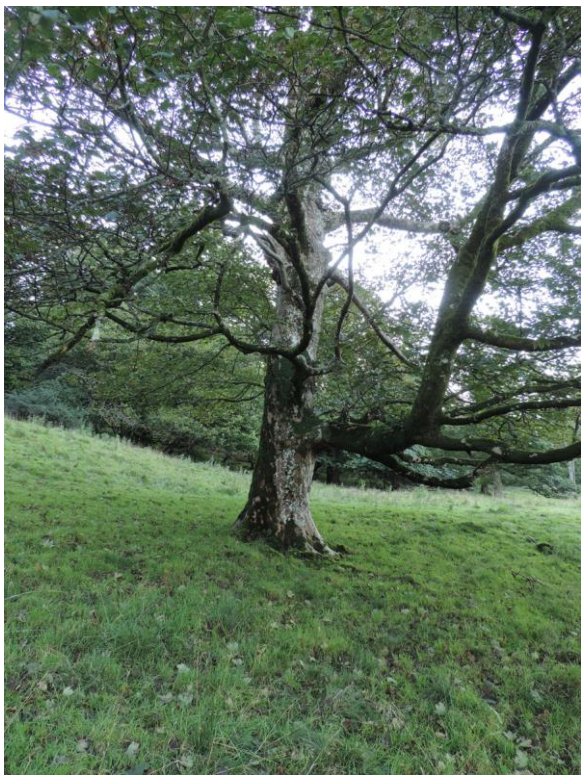
**RDN018** (NY36978 06316, 73m): post-mature Sycamore at top of park in open with spreading branches

| | | | |
|---|---|---|---|
| ***Cetrelia cetrarioides*** | Ap Tw | | Wind blown |
| ***Lobaria pulmonaria*** | Ap | O | High up |
| ***Lobaria virens*** | Ap up | A | Big thalli 2 – 4m, smaller higher |

**Other Species**

| | |
|---|---|
| *Pertusaria albescens* var. *corallina* | Ap |
| *Pertusaria hymenea* | Ap |
| *Amandinea punctata* | Ap |
| *Lecidella elaeochroma* f. *elaeochroma* | Ap |

**Photos** 2019-09-05-01 & 2



**Photos 2019-09-04-11**: **Tree RDN016**: a very rich post-mature Sycamore in unimproved parkland, with ***Lobaria pulmonaria*** (high up), ***Lobaria virens***, abundant lower down (right photo, large green thalli on the trunk about the limb and extending on to them. Cetrelia cetrarioides was also found as wind blow on a Sycamore twig below the tree.

**NY369 063**
**Species of Interest**

| | |
|---|---|
| *Cetrelia cetrarioides* | Ap Tw |
| *Lepraria membranacea* | Q |
| *Lobaria pulmonaria* | Ap |
| *Lobaria virens* | Ap |
| *Lopadium disciforme* | Q |
| *Mycobilimbia epixanthoides* | Q |
| *Pachyphiale carneola* | Q |

**Other Species**

| | |
|---|---|
| *Amandinea punctata* | Ap |
| *Lecidella elaeochroma* f. *elaeochroma* | Ap |
| *Pertusaria albescens* var. *corallina* | Ap, Q |
| *Pertusaria hymenea* | Ap |

**NY3706**

**NY370 062**
Knoll at top of Middle Park

**RDN019** (NY37046 06245, 93m): post-mature Sessile Oak on knoll at top of park

| | | |
|---|---|---|
| ***Hypotrachyna taylorensis*** | Q | F |

**RDN020** (NY37030 06265, 95m): post-mature Sessile Oak at top of park, in open with no overhanging branches

| | |
|---|---|
| ***Hypotrachyna taylorensis*** Q | O |

Also

| | |
|---|---|
| *Lepraria membranacea* | Q |
| *Megalaria pulverea* | Q |

**NY370 062**
**Species of Interest**

| | |
|---|---|
| *Hypotrachyna taylorensis* | Q |
| *Lepraria membranacea* | Q |
| *Megalaria pulverea* | Q |

**Other Species**

| | |
|---|---|
| *Cladonia coniocraea* | Q |
| *Ochrolechia androgyna* | Q |

**NY371 061**
Old Alders

**NY371 061**
**Species of Interest**

| | |
|---|---|
| *Lepraria membranacea* | Al |

**Other Species**

| | |
|---|---|
| *Calicium glaucellum* | Lal |
| *Cladonia digitata* | Al |
| *Cladonia polydactyla* var. *polydactyla* | Al |
| *Flavoparmelia caperata* | Al |
| *Hypocenomyce scalaris* | Al |
| *Hypotrachyna afrorevoluta* | Al |
| *Lecanora expallens* | Al |
| *Lepraria rigidula* | Al |
| *Melanelixia glabratula* | Al |

**A2.3 Campsite**

Joined the main party and recorded more of the veteran trees in the campsite as we made our way up to the High Park. The veteran trees in the campsite appear to be an extension of the middle park habitat.

**NY3606**

**NY366 065**

Brain Coppins recorded here

**Species of Interest**

| | |
|---|---|
| *Micarea doliiformis* | Q |
| *Micarea stipitata* | Q |
| *Trapelia corticola* | Q |

**Other Species**

| | |
|---|---|
| *Dendrographa decolorans* | Q |
| *Lepraria membranacea* | Q |
| *Micarea doliiformis* | Q |
| *Micarea prasina* s. lat. | Q |

**NY366 064**

**RDR021** (NY36600 06487, 82m): post-mature Sessile Oak 00471

| | |
|---|---|
| ***Agonimia octospora*** | Q |
| ***Rinodina isidioides*** | Q |
| ***Rinodina roboris* var. *roboris*** | Q |
| ***Thelopsis rubella*** | Q |

Other Species

| | |
|---|---|
| *Acrocordia gemmata* | Q |
| *Aquacida viridifarinosa* | Q |
| *Opegrapha* cf *multipuncta* | Q Taxa now known not to be *Opegrapha multipuncta s*. str. (DNA sequencing) not yet named |

Added by Vince Giavarini 4/9/2019:

**NY36670 06485**

| | |
|---|---|
| *Arthonia digitatae* | Cf, Z0408 On *Cladonia polydactyla* on thick fibrous bole of Wellingtonia. New to Northern England |

| | |
|---|---|
| *Cladonia polydactyla* | Cf |
| *Clypeococcum hypocenomycis* | Cf, Z0578 On *Hypocenomyce scalaris* on thick fibrous bole of Wellingtonia |
| *Hypocenomyces scalaris* | Cf |

**NY36667 06479**

| | |
|---|---|
| *Lichenoconium lecanorae* | P, Z0643 On *Lecanora conizaeoides* on dead Pine. New to Westmorland |
| *Tremella hypogymniae* | P, Z0582 On *Hypogymnia physodes*, on dead Pine. New to Northern England |

**NY365 064**
**Species of Interest**

| | |
|---|---|
| *Chaenotheca brunneola* | LQ |
| *Micarea doliiformis* | Q |

Steve Price added

**NY3659 0649**
**Other Species**

| | |
|---|---|
| *Cladonia coniocraea* | Q |
| *Flavoparmelia caperata* | Q |
| *Graphis scripta* | Sb |
| *Ochrolechia androgyna* | Q |

**NY365 065**
**Species of Interest**

| | |
|---|---|
| *Anisomeridium ranunculosporum* | Q |
| *Lepraria membranacea* | Q, Bt |
| *Micarea doliiformis* | Q |
| *Micarea stipitata* | Q |
| *Ropalospora viridis* | Bt |
| *Thelotrema lepadinum* | Q |
| *Trapelia corticola* | Q |

**Other Species**

| | |
|---|---|
| *Dendrographa decolorans* | Q |

Steve Price added

**NY367 065**
Top edge of campsite

**RDN022** (NY36769 06548, 104m): fallen dead Oak in parkland

| | |
|---|---|
| **Chaenothecopsis nigra** | LQ R Coll. Spores one septate, septa thicker than cell wall. Herb. Sanderson 2654. On underside of a fallen trunk |

Also

| | |
|---|---|
| *Chaenotheca brunneola* | LQ |
| *Cladonia parasitica* | LQ |
| *Imshaugia aleurites* | LQ |

Also species marked LQ below
Tree to east

| | | |
|---|---|---|
| ***Calicium lenticulare*** | Q | Coll Herb. DL, grey-green granular thallus; stalk I + blue. |

Also

| | | |
|---|---|---|
| *Micarea stipitata* | Q | |

**NY367 065**
**Species of Interest**

| | | |
|---|---|---|
| *Calicium lenticulare* | Q | |
| *Chaenotheca brunneola* | LQ | |
| *Chaenothecopsis nigra* | LQ | |
| *Cladonia caespiticia* | Q | |
| *Cladonia parasitica* | LQ | |
| *Micarea stipitata* | Q | |
| *Micarea xanthonica* | Q | |
| *Mycoblastus caesius* | Q | |
| *Peltigera horizontalis* | Ap | |

**Other Species**

| | | |
|---|---|---|
| *Calicium glaucellum* | LQ | |
| *Chrysothrix flavovirens* | Ap, Q | |
| *Cladonia digitata* | LQ, Q | |
| *Cladonia polydactyla* var. *polydactyla* | LQ | |
| *Cladonia squamosa* var. s*ubsquamosa* | LQ | |
| *Hypogymnia physodes* | LQ | |
| *Lecanactis abietina* | Q | |
| *Micarea leprosula* | LQ | |
| *Micarea peliocarpa* | Q | |
| *Trapeliopsis flexuosa* | LQ, Q | |
| *Trapeliopsis granulosa* | LQ | fr |
| *Violella fucata* | LQ | |

Added by Brain Coppins

| | | |
|---|---|---|
| *Arthrorhaphis aeruginosa* | LQ, *Cladonia* sp | |
| *Hypocenomyce scalaris* | LQ | |
| *Micarea melaena* | LQ | |
| *Placynthiella icmalea* | LQ | |

### A2.3 High Park

Extensive outbye pasture woodland, markedly more acidified than the parkland below. Observations on leaving suggested that this might reflect the frequency of occurrence mist higher up the slope. The pasture woodland includes flushed Alder stands, groves of veteran Oak lower down and veteran Ash higher up. There are rare ancient Hollies and occasional planted exotics including Beech and horse Chestnut. There are frequent glades with much Bracken.

**NY368 065**
Started off in Alder stands, moving into old Oak in Bracken above

**RDN034** (NY3680 0657, 120m) Alder twig in Alder stand in flush in upland pasture woodland

| | | |
|---|---|---|
| ***Phaeographis inusta*** | Al Tw | New to Northern England |

**Photo** P9055456

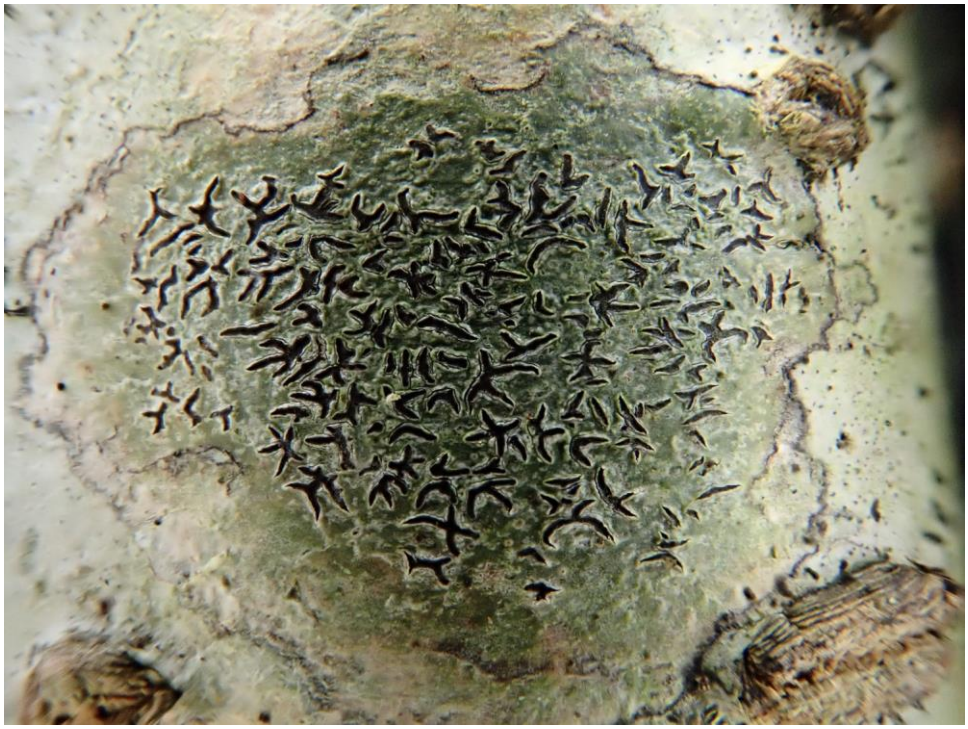


**Photo P9055456**: Phaeographis inusta on Alder, new to Northern England. © Steve Price

**NY368 065**

**Species of Interest**

| | | |
|---|---|---|
| *Anisomeridium ranunculosporum* | Al, Q | |
| *Arthonia vinosa* | Q | |
| *Arthrorhaphis aeruginosa* | Q, Z0408 | |
| *Chaenotheca brunneola* | LQ | |
| *Chaenotheca chrysocephala* | Q | NY3686 0658 |
| *Lepraria membranacea* | Q | |
| *Lopadium disciforme* | Fx | |
| *Megalaria pulverea* | Al, Fx | |
| *Micarea doliiformis* | Q | |
| *Micarea stipitata* | Q | |
| *Phaeographis inusta* | Al Tw | NY3680 0657 New to Northern England |
| *Ropalospora viridis* | Al | |

**Other Species**

| | |
|---|---|
| *Abrothallus microspermus* | Q Z0987 |
| *Arthonia spadicea* | Al |
| *Chrysothrix candelaris* | Q |
| *Chrysothrix flavovirens* | Q |
| *Cladonia coniocraea* | Al, Q |
| *Cladonia digitata* | Q |
| *Cladonia ramulosa* | Q |
| *Cliostomum griffithii* | Q |
| *Dendrographa decolorans* | Q |
| *Flavoparmelia caperata* | Q |
| *Graphis scripta* | Al Tw |
| *Hypocenomyce scalaris* | Q |
| *Lecanactis abietina* | Q |
| *Lecanora expallens* | Q |
| *Ochrolechia androgyna* | Fx |
| *Opegrapha vulgata* | Ae |
| *Parmelia saxatilis* | Q |
| *Ropalospora viridis* | Al |
| *Stenocybe pullatula* | Al Tw |
| *Trapeliopsis flexuosa* | Al, Q |
| *Usnea subfloridana* | Q |

**Twigs on old Oak NY3686 0658**:

| | |
|---|---|
| *Candelariella xanthostigmoides* | Q Tw |
| *Dimerella pineti* | Q |
| *Evernia prunastri* | Q Tw |
| *Flavoparmelia caperata* | Q Tw |
| *Fuscidea lightfootii* | Q Tw |
| *Graphis elegans* | Q Tw |
| *Hypogymnia tubulosa* | Q Tw |
| *Hypotrachyna afrorevoluta* | Q Tw |
| *Lecanora pulicaris* | Q Tw |
| *Marchandiomyces corallinus* | Q Tw, Z1020, Z0511 |
| *Melanelixia subaurifera* | Q Tw |
| *Parmelia saxatilis* | Q Tw |
| *Parmelia sulcata* | Q Tw |

| | | |
|---|---|---|
| *Platismatia glauca* | Q Tw | |
| *Punctelia jeckeri* | Q Tw | R |
| *Ramalina farinacea* | Q Tw | R |
| *Usnea subfloridana* | Q Tw | |

Brian Coppins Added:

| | |
|---|---|
| *Cladonia coniocraea* | LQ |
| *Cladonia polydactyla* var. *polydactyla* | LQ |
| *Placynthiella icmalea* | LQ |
| *Trapelia corticola* | LQ |
| *Trapeliopsis flexuosa* | LQ |
| *Violella fucata* | LQ |

**NY368 066**
Ash and a boulder (NY36830661) recorded here by Brian Coppins. Extensive recording of the trees by Steve Price

Brian Coppins recorded on tree of high interest

**RDB002** (NY3683 0661, 130m): Ash in lower part of wood (GR from boulder not tree)
***Hypotrachyna taylorensis*** Fx

Steve Price recorded three trees of high interest:

**RDP001** (NY3689 0666, 160m) Oak with *Cetrelia olivetorum* s. lat. recorded, taken to be *Cetrelia cetrarioides*.
***Cetrelia cetrarioides*** Q

**RDP002** (NY3683 0667, 160m) rich Ash or Ash stand
***Phyllopsora rosei***
***Thelopsis rubella***
Also
*Peltigera horizontalis*
*Thelotrema lepadinum*

**RDP003** (NY 36850 06630, 140m) Ash
***Rinodina roboris* var. *roboris*** Fx

Brian Coppins:

**NY368 066**
**Species of Interest**

| | |
|---|---|
| *Hypotrachyna taylorensis* | Fx |
| *Lopadium disciforme* | Fx |
| *Megalaria pulverea* | Fx |

**Other Species**

| | |
|---|---|
| *Lecidea lithophila* | SS |
| *Micarea coppinsii* | SS |
| *Micarea lignaria* var. *lignaria* | SS |
| *Peltigera hymenina* | SS |
| *Porpidia tuberculosa* | SS |

| | |
|---|---|
| *Rhizocarpon reductum* | SS |
| *Stereocaulon vesuvianum* var. *vesuvianum* | SS |
| *Trapelia glebulosa* s. lat. | SS |

Steve Price added:
**NY368 066**
**Species of Interest**

| | |
|---|---|
| *Cetrelia olivetorum* s. lat. | Q |
| *Peltigera horizontalis* | Fx |
| *Phyllopsora rosei* | Fx |
| *Rinodina roboris* var. *roboris* | Fx |
| *Thelopsis rubella* | Fx |
| *Thelotrema lepadinum* | Fx |

**Other Species**

| | |
|---|---|
| *Arthonia elegans* | Co |
| *Arthonia radiata* | Q |
| *Chrysothrix candelaris* | Fx |
| *Cladonia coniocraea* | Q |
| *Cladonia digitata* | LQ |
| *Evernia prunastri* | Q |
| *Flavoparmelia caperata* | Q |
| *Fuscidea lightfootii* | Q |
| *Graphis elegans* | Q |
| *Graphis scripta* | Q, Co, Fx |
| *Hypogymnia physodes* | Q |
| *Hypotrachyna afrorevoluta* | Q |
| *Melanelixia glabratula* | Q |
| *Melanohalea elegantula* | Q |
| *Normandina pulchella* | Fx, Co, Q |
| *Ochrolechia androgyna* | Q |
| *Opegrapha atra* | Co |
| *Opegrapha herbarum* | Fx |
| *Opegrapha rufescens* | Fx |
| *Parmelia sulcata* | Q |
| *Peltigera hymenina* | Fx |
| *Peltigera praetextata* | Fx |
| *Pertusaria hymenea* | Fx |
| *Pertusaria leioplaca* | Q |
| *Physcia aipolia* | Q |
| *Physcia tenella* | Q |
| *Punctelia jeckeri* | Q |
| *Ramalina farinacea* | Q |

**NY36850664**

**NY369 065**
Some Ash and exotics in open old Sessile Oak, Brian Coppins found more interest by ascending more to the east

Brian Coppins recorded:

**RDB003** (NY3696 0655, 150m): old Oak in pasture woodland

| | | |
|---|---|---|
| ***Biatora vernalis*** | Q | |
| ***Bryobilimbia sanguineoatra*** | Q | |
| Also | | |
| *Micarea doliiformis* | Q | |
| *Micarea stipitata* | Q | |
| *Ochrolechia androgyna* | Q | |
| *Sphaerophorus globosus* | Q | |
| *Thelotrema lepadinum* | Q | |
| *Trapeliopsis pseudogranulosa* | Q | |

Neil Sanderson:

**NY369 065**

**Species of Interest**

| | | |
|---|---|---|
| *Anisomeridium ranunculosporum* | Q | |
| *Biatora vernalis* | Q | BJC |
| *Bryobilimbia sanguineoatra* | Q | BJC |
| *Lopadium disciforme* | Q | |
| *Micarea doliiformis* | Q | |
| *Micarea stipitata* | Q | |
| *Pachyphiale carneola* | Co | BJC |
| *Porina byssophila* | Co | BJC |
| *Thelotrema lepadinum* | Q | |
| *Trapelia corticola* | Q | BJC |

**Other Species**

| | | |
|---|---|---|
| *Pyrrhospora quernea* | Q | |
| *Phlyctis argena* | Q | |

Vince Giavarini added:

| | | |
|---|---|---|
| *Taeniolella punctata* | Q, Z0533 | On *Graphis scripta* on Oak. New to Westmorland |
| *Taeniolella toruloides* | Q, Z1410 | On *Thelotrema lepadinum* on Oak. New to Westmorland |

Brian Coppins added:

**NY369 065**

**Species of Interest**

| | | |
|---|---|---|
| *Biatora vernalis* | Q | Sterile New to Westmorland |
| *Bryobilimbia sanguineoatra* | Q | |
| *Pachyphiale carneola* | Co | |
| *Porina byssophila* | Co | New to Westmorland |
| *Sphaerophorus globosus* | Q | |
| *Trapelia corticola* | Q | |

**Other Species**

| | | |
|---|---|---|
| *Arthonia cinnabarina* | Co | |
| *Arthonia spadicea* | Q | |
| *Graphis scripta* | Co | |
| *Haematomma ochroleucum* var. *porphyrium* | SS | |
| *Lecanora gangaleoides* | SS | |

| | | |
|---|---|---|
| *Melanelixia glabratula* | Co | |
| *Micarea prasina s. lat.* | Q | |
| *Ochrolechia androgyna* | Q | |
| *Opegrapha gyrocarpa* | SS | |
| *Opegrapha vulgata* | Co | |
| *Pertusaria hymenea* | Co | |
| *Pyrrhospora quernea* | Q | |
| *Taeniolella punctata* | Co, Z0533 | New to Westmorland |
| *Trapeliopsis pseudogranulosa* | Q | |

Steve Price added:

**NY3697 0659**
**Species of Interest**

| | |
|---|---|
| *Chaenotheca trichialis* | Q |
| *Pachyphiale carneola* | Q |
| *Thelotrema lepadinum* | Q |

**Other Species**

| | |
|---|---|
| *Chaenotheca ferruginea* | Q |
| *Hypocenomyce scalaris* | Q |
| *Ochrolechia androgyna* | Q |
| *Platismatia glauca* | Q |
| *Pyrrhospora quernea* | Q |
| *Violella fucata* | Q |

**NY369 066**
Increasing Ash on the way up

**NY369 066**
**Species of Interest**

| | |
|---|---|
| *Anisomeridium ranunculosporum* | Fx, Co |
| *Bacidia biatorina* | Ae |
| *Hypotrachyna laevigata* | Fx |
| *Lopadium disciforme* | Fx |
| *Peltigera horizontalis* | Fx |

**Other Species**

| | |
|---|---|
| *Graphis scripta* | Co |
| *Hypotrachyna afrorevoluta* | Co |
| *Melanelixia glabratula* | Ae |
| *Melanelixia glabratula* | Co |
| *Normandina pulchella* | Co |
| *Peltigera hymenina* | Fx |
| *Pertusaria leioplaca* | Co |
| *Phlyctis argena* | Co |
| *Porina aenea* | Ae |
| *Pyrrhospora quernea* | Ae |

**NY3706**

**NY370 065**
**Species of Interest**

| | |
|---|---|
| *Anisomeridium ranunculosporum* | Q |
| *Arthonia vinosa* | Q |
| *Lepraria membranacea* | Q |
| *Micarea doliiformis* | LQ |
| *Thelotrema lepadinum* | Q |
| **Other Species** | |
| *Graphis scripta* | Fg |
| *Normandina pulchella* | Fx |
| *Ochrolechia subviridis* | Q |
| *Parmelia saxatilis* | Q |
| *Pertusaria flavida* | Q |
| *Pertusaria hymenea* | Q |
| *Pertusaria leioplaca* | Fg |
| *Usnea cornuta* | Q |
| *Varicellaria hemisphaerica* | Q |

Brian Coppins added:

**NY370 065**
**Species of Interest**

| | |
|---|---|
| *Anisomeridium ranunculosporum* | Fx |
| *Chaenotheca brunneola* | LQ |
| *Cladonia parasitica* | LQ |
| *Lepraria membranacea* | LQ |
| *Megalaria pulverea* | CFx |
| *Peltigera horizontalis* | Fx |
| *Thelotrema lepadinum* | Fx |
| **Other Species** | |
| *Arthonia didyma* | Co |
| *Arthonia radiata* | Q |
| *Lecanora expallens* | LQ |
| *Lepraria incana* s. str. | Q |
| *Peltigera praetextata* | Fx |
| *Phlyctis argena* | Co |
| *Pyrrhospora quernea* | Q |

**NY370 066**
Area with some Hazel along with Ash

**RDN023** (NY37011 06629, 168m): post-mature Ash on edge of grove

| | | |
|---|---|---|
| ***Cetrelia cetrarioides*** | Fx | One thallus |
| Also | | |
| *Megalaria pulverea* | Fx | |

**RDN024** (NY37035 06612, 173m): rock in Bracken

| | | |
|---|---|---|
| *Peltigera hymenina* | SS | Coll. proved not to be interesting |

**NY370 066**
**Species of Interest**

| | |
|---|---|
| *Cetrelia cetrarioides* | Fx |

| | |
|---|---|
| *Eopyrenula avellanae* | Co NY3702 06639, 178m, Coll. Herb. Sanderson 2649. Fertile, spores three septate, 10 – 12 x 6 – 7µm, conidia three septate 11 – 12 x 5 – 6µm. New to Westmorland |
| *Megalaria pulverea* | Fx |
| **Other Species** | |
| *Micarea byssacea* s. lat. | LFx Spores 9 – 11 x 2.5 – 3.0µm, apothecia sections K – & C –, NY3704 0663 |
| *Taeniolella punctata* | Co, Z0533 |
| *Graphis scripta* | Co |
| *Arthonia radiata* | Co |
| *Arthonia cinnabarina* | Co |
| *Anisomeridium polypori* | Fx |
| *Paranectria oropensis* subsp. *oropensis* | Fx, Z0820 Coll |
| *Arthonia radiata* | Ct |
| *Hypotrachyna afrorevoluta* | Ct |
| *Graphis elegans* | Ct |
| *Agonimia tristicula* | Fx |
| *Lepraria incana* s. lat. | Fx |
| *Peltigera hymenina* | SS |

**NY3706**

After lunch on the brow of the steep slope, we headed up in to the much more open upper "savanna" with old Ash set in Bracken and flushed grassland. Much of the Ash was acidified but scattered trees of considerable interest were found (**Photo** 2019-09-05-03)

**Photos 2019-09-05-03 & 5**: a views of the open upper part of High Park, with scattered old Ash in Bracken, wet flushes and acid grassland.

**NY371 067**
A base rich old Ash

**RDN025** (NY37159 06756, 235m) base rich old Ash

| | | |
|---|---|---|
| ***Pannaria conoplea*** | Fx | 1 tiny bit |

Also

| | |
|---|---|
| *Mycobilimbia epixanthoides* | Fx |
| *Peltigera horizontalis* | Fx |
| *Thelotrema lepadinum* | Fx |

Plus other Ash species below

**NY371 067**
**Species of Interest**

| | |
|---|---|
| *Pannaria conoplea* | Fx |
| *Mycobilimbia epixanthoides* | Fx |
| *Peltigera horizontalis* | Fx |
| *Thelotrema lepadinum* | Fx |
| *Mycobilimbia epixanthoides* | Fx |

**Other Species**

| | |
|---|---|
| *Agonimia tristicula* | Fx |
| *Cladonia pyxidata* | Fx |
| *Ochrolechia subviridis* | Fx |
| *Peltigera praetextata* | Fx |
| *Thelenella muscorum* var. *muscorum* | Fx |

From this tree Brian Coppins added:

**NY3715 0675**

**Other Species**

| | |
|---|---|
| *Acrocordia gemmata* | Fx |
| *Normandina pulchella* | Fx |

Steve Price added the following, also from the same tree

**NY3716 0675**
**Other Species**

| | |
|---|---|
| *Gyalecta truncigena* | Fx |

**NY372 067**
Brian Coppins recorded trees and a low crag at NY3720 0673

**RDB004** (NY3720 0673, 240m): Ash pollard near stream

| | |
|---|---|
| ***Hypotrachyna taylorensis*** | Fx |

Also

| | |
|---|---|
| *Normandina pulchella* | Fx |
| *Thelotrema lepadinum* | Fx |

**NY372 067**
**Species of Interest**

| | |
|---|---|
| *Hypotrachyna taylorensis* | Fx |
| *Thelotrema lepadinum* | Fx |

**Other Species**

| | |
|---|---|
| *Arthopyrenia analepta* | Q Tw |
| *Buellia griseovirens* | Q Tw |
| *Graphis elegans* | Q Tw |
| *Normandina pulchella* | Fx |

**Rocks**:

| | |
|---|---|
| *Arthrorhaphis citrinella* | SS |
| *Cladonia subcervicornis* | SS |
| *Diploschistes scruposus* | SS |
| *Fuscidea cyathoides* var. *cyathoides* | SS |
| *Fuscidea recensa* | SS |
| *Massalongia carnosa* | SS |
| *Pertusaria aspergilla* | SS |
| *Porpidia rugosa* | SS |
| *Porpidia tuberculosa* | SS |
| *Rhizocarpon geographicum* | SS |
| *Rhizocarpon lavatum* | SS |
| *Stereocaulon vesuvianum* var. *vesu*vianum | SS |
| *Trapelia glebulosa* | SS |
| *Varicellaria lactea* | SS |

**NY372 066**
This area was recorded by Brian Coppins

**RDB005** (NY3723 0669, 240m): Ash

| | | |
|---|---|---|
| **Pannaria conoplea** | Fx | 1 small thallus near base of trunk |

**Also**

| | | |
|---|---|---|
| *Megalaria pulverea* | Fx | |

**RDB006** (NY3723 0665, 240m): Ash

| | | |
|---|---|---|
| ***Cetrelia cetrarioides*** | CFx | medulla C – |

**NY372 066**

**Species of Interest**

| | | |
|---|---|---|
| *Cetrelia cetrarioides* | Fx | |
| *Hypotrachyna taylorensis* | Fx | |
| *Megalaria pulverea* | Fx | |
| *Pannaria conoplea* | Fx | |
| *Sphaerophorus globosus* | Q | |
| *Thelotrema lepadinum* | Fx | |

**Other Species**

| | | |
|---|---|---|
| *Burgoa angulosa* | Fx | With algal scum on moribund moss |
| *Catillaria nigroclavata* | Fg Tw | |
| *Fuscidea lightfootii* | Fg Tw | |
| *Halecania viridescens* | Fg Tw | fr. New to Westmorland |
| *Hypotrachyna afrorevoluta* | Fg Tw | |
| *Lecidella elaeochroma* f. *elaeochroma* | Fg Tw, Fx | |
| *Melanelixia glabratula* | Fx | |
| *Micarea lignaria var. lignaria* | Fx | |
| *Ochrolechia androgyna* | Q | fr. |
| *Ochrolechia subviridis* | Fx | |
| *Peltigera praetextata* | Fx | |
| *Pertusaria hymenea* | Fx | |
| *Pertusaria pertusa* | Fx | |
| *Physcia tenella* | Fg Tw | |
| *Punctelia subrudecta s. str.* | Fg Tw | |
| *Ramalina farinacea* | Fg Tw | |
| *Xanthoria parietina* | Fg Tw | |
| *Xanthoriicola physciae* | Fg Tw, Z1530 | On *Xanthoria parietina* |

**NY371 068**

**RDN026** (NY37152 06870, 251m): ancient Ash in open

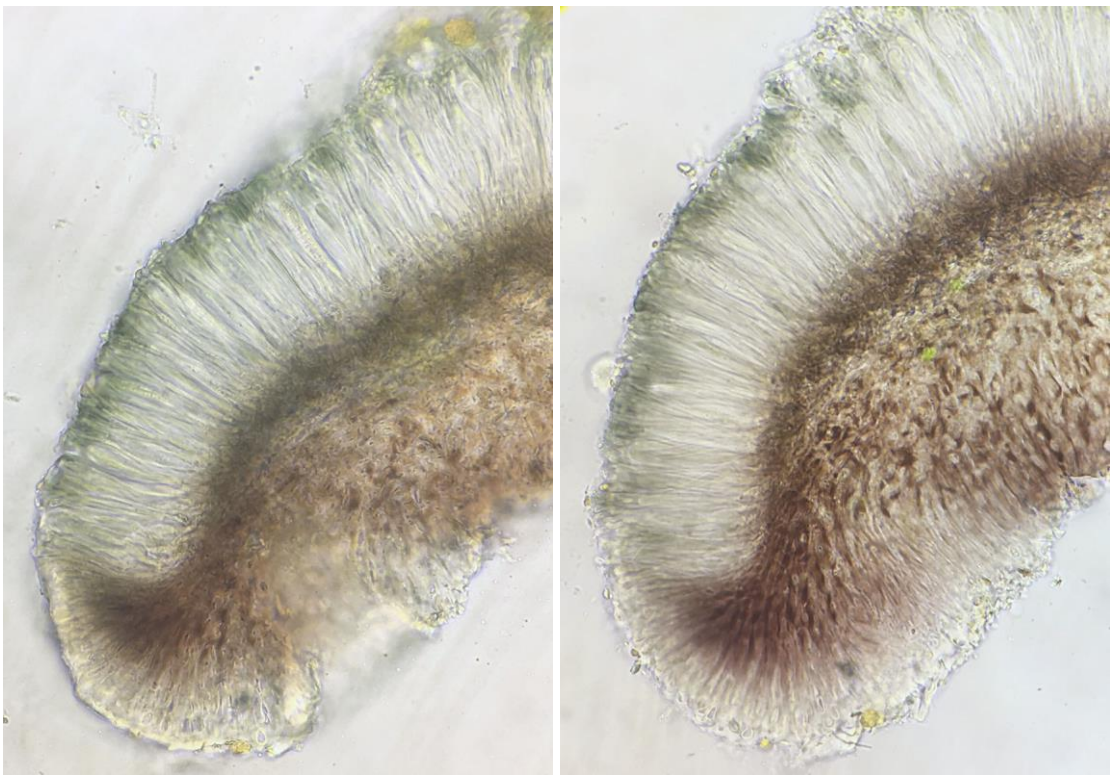
| | | |
|---|---|---|
| ***Bacidia subincompta*** | Fx | Coll. Epithecium green, K –, N+ violet; exciple & hypothecium dark red-brown, K+ purple; bacilliform spores 20 – 30 x 3µm, to 7 septate |

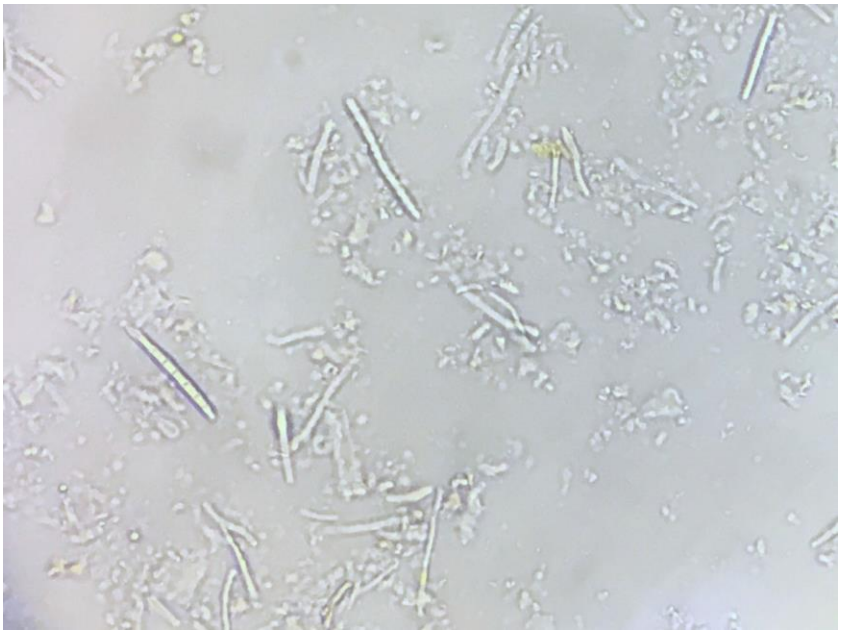
Also

| | | |
|---|---|---|
| *Bacidia biatorina* | Fx | |

Plus other Ash species below

**Photos** IMG_4710, IMG_4713 & IMG_4715





**Photos IMG_4710, IMG_4713 & IMG_4715**: RDN026, an ancient Ash in the open, with ***Bacidia subincompta***. Apothecia cross section in water top left, in K top right and the spores below © Dave Lamacraft

**NY371 068**

| | | |
|---|---|---|
| **Species of Interest** | | |
| *Bacidia biatorina* | Fx | |
| *Bacidia subincompta* | | |
| **Other Species** | | |
| *Bacidia rubella* | Fx | |
| *Lecanora argentata* | Fx | Coll. No crystals in epithecium |
| *Opegrapha vulgaris* | Fx | Coll. |

*Pertusaria hymenea* Fx
*Phlyctis argena* Fx

Dave Lamacraft added from RDN026
*Opegrapha herbarum* Fx

**NY370 068**
Further scattered Ash of interest

**RDN027** (NY37032 06898, 237m): ancient hollow Ash in open
***Pannaria conoplea*** Fx C
Also
*Bacidia rubella* Fx, LFx
*Leptogium teretiusculum* Fx
*Peltigera praetextata* Fx
**Photo** 2019-09-05-04

**Photo 2019-09-05-04**: **RDN027** ancient hollow Ash in open ground in Bracken and acid grassland, with ***Pannaria conoplea*** dominating the lower part of the tree (blue grey spread on the right hand side of the trunk).

**RND028** (NY37055 06830, 225m): hollow Ash in open in small valley
***Cetrelia cetrarioides*** Fx F

**NY370 068**
**Species of Interest**
*Pannaria conoplea* Fx
*Cetrelia cetrarioides* Fx
*Leptogium teretiusculum* Fx

**Other Species** (on RDN027)

| | |
|---|---|
| *Bacidia rubella* | Fx, LFx |
| *Caloplaca ulcerosa* | Fx |
| *Lecidella elaeochroma* f. *elaeochroma* | Fx |
| *Opegrapha ochrocheila* | Fx |
| *Peltigera praetextata* | Fx |
| *Xanthoria parietina* | Fx |

**NY370 069**

**Species of Interest**

| | |
|---|---|
| *Gyalecta flotowii* | LFx Coll. Herb. DL NY3700 0691 cankerous Ash |
| *Leptogium lichenoides* | Fx |
| *Leptogium subtile* | LFx NY3700 0691 cankerous Ash |

**Other Species**

| | |
|---|---|
| *Acrocordia gemmata* | Fx |
| *Amandinea punctata* | Fx |
| *Gyalecta truncigena* | LFx Coll DL |
| *Pseudoschismatomma rufescens* | Fx |

**NY371 066**

Going south east along path

**NY371 066**

**Other Species**

| | |
|---|---|
| *Buellia griseovirens* | Fx |

**NY372 065**

**RDN029** (NY37293 06585, 236m): ancient hollow Ash in open in a dell

| | |
|---|---|
| ***Mycobilimbia pilularis*** | Fx |
| ***Pannaria conoplea*** | Fx |
| ***Parmeliella triptophylla*** | Fx |

Also

| | |
|---|---|
| *Caloplaca alstrupii* | Fx Coll. Thallus with blister-like protuberances bursting to expose crater like soralia; blister tearing to leave a lid-like structure, which is dark coloured; soredia yellow-green. Herb. Sanderson 2651. New to Westmorland |
| *Dactylospora*? Sp | LFx Epithecium, hymenium and hypothecium brown, K –; spores one septate, 9 – 11 x 4 – 5µm. Herb. Sanderson 2652. |
| *Gyalecta truncigena* | LFx |
| *Lecania cyrtellina* | Fx Coll. Simple spores, less than 3µm wide Herb. Sanderson 2651. New to Westmorland |
| *Leptogium lichenoides* | Fx |
| *Mycobilimbia epixanthoides* | Fx |
| *Thelenella muscorum* var. *muscorum* | Fx |

**Photo** 2019-09-05-06

**Photo 2019-09-05-06**: **RDN029** ancient hollow Ash in open ground in a dell, in Bracken with ***Pannaria conoplea***, ***Mycobilimbia pilularis*** and ***Parmeliella triptophylla***.

Brain Coppins added:

**NY3725 0658**
**Other Species**

| | |
|---|---|
| *Hypogymnia tubulosa* | Q Tw |
| *Lichenomphalia umbellifera* | LQ |
| *Punctelia jeckeri* | Q Tw |

Steve Price added:

**NY3725 0656**
**Species of Interest**

| | |
|---|---|
| *Chaenotheca brunneola* | Q |

**NY373 065**
Steve Price recorded a rock outcrop

**NY37320650**

| | |
|---|---|
| *Cladonia subcervicornis* | SS |
| *Fuscidea cyathoides* var. *cyathoides* | SS |
| *Lecanora soralifera* | SS |
| *Lecidea lithophila* | SS |
| *Lecidella scabra* | SS |
| *Ochrolechia androgyna* | SS |
| *Parmelia saxatilis* s. lat. | SS |
| *Pertusaria corallina* | SS |
| *Porpidia tuberculosa* | SS |
| *Rhizocarpon geographicum* | SS |

| | |
|---|---|
| *Sclerococcum sphaerale* | SS, Z1066 |
| *Stereocaulon evolutum* | SS |
| *Trapelia glebulosa* | SS |
| *Varicellaria lactea* | SS |
| *Xanthoparmelia conspersa* | SS |

**NY373 064**
Heading back down

**Photo 2019-09-05-07**: ancient hollow Ash with a spring arising in its roots.

**RDN030** (NY37342 06484, 234m): ancient Ash

| | | |
|---|---|---|
| ***Cetrelia cetrarioides*** | Fx | O |
| Also | | |
| *Thelotrema lepadinum* | Fx | |

**NY372 064**
**Species of Interest**

| | | |
|---|---|---|
| *Peltigera horizontalis* | Fx, Ma | Ma recorded DL |
| **Other Species** | | |
| *Thelenella muscorum* var. *muscorum* | Fx | |

Brian Coppins added:

**NY3727 0647**
**Species of Interest**

| | | |
|---|---|---|
| *Peltigera horizontalis* | Ma, Lma | Abundant |
| **Other Species** | | |
| *Buellia griseovirens* | Fx Tw | |
| *Cladophialophora parmeliae* | Fx Tw, Z2468 | On *Hypotrachyna afrorevoluta*. New to England |

| | | |
|---|---|---|
| *Fuscidea lightfootii* | Fx Tw | |
| *Hypotrachyna afrorevoluta* | Fx Tw | |
| *Marchandiomyces corallinus* | Fx Tw, Z1015 | On *Parmelia saxatilis* |
| *Micarea coppinsii* | Fx Tw | |
| *Nigromacula uniseptata* | Fx Tw, Z2468 | On *Hypotrachyna afrorevoluta*. New to Northern England |
| *Parmelia saxatilis* s. lat. | Fx Tw | |
| *Platismatia glauca* | Fx Tw | |

**NY371 064**
Hazel groves, with tree Hazel, also rare old Holly

**NY371 064**
**Species of Interest**

| | |
|---|---|
| *Anisomeridium ranunculosporum* | Ix |
| *Cladonia caespiticia* | Al |
| *Lepraria membranacea* | Al |
| *Megalaria pulverea* | Al |
| *Thelotrema lepadinum* | Ix |

**Other Species**

| | |
|---|---|
| *Lecanactis abietina* | Al |

Brian Coppins added:

**NY37180642**
**Other Species**

| | |
|---|---|
| *Graphis elegans* | Al |
| *Lepraria incana* s. str. | Al |
| *Micarea coppinsii* | LQ |
| *Micarea lignaria* var. *lignaria* | Al |
| *Micarea peliocarpa* | LQ, Q |
| *Micarea viridileprosa* | Al |

**NY370 064**
**Species of Interest**

| | |
|---|---|
| *Leptogium lichenoides* | Fx |
| *Micarea doliiformis* | Q |
| *Peltigera horizontalis* | Fx |
| *Thelotrema lepadinum* | Fx, Q |

Brian Coppins added:

**NY3706 0641**
**Species of Interest**

| | | |
|---|---|---|
| *Pachyphiale carneola* | Co | |
| *Taeniolella toruloides* | Fx,Z1410 | On *Thelotrema lepadinum* |

**NY370 063**
More ancient Holly

**RDN031** (NY37047 06384, 146m): ancient Holly on rock outcrop in denser woodland.

| | | |
|---|---|---|
| ***Mycoporum lacteum*** | Ix | |
| Also | | |
| *Taeniolella toruloides* | Ix, Z1410 | New to Westmorland |
| *Thelotrema lepadinum* | Ix | |

**Photo** 2019-09-05-07

**Photo 2019-09-05-07**: **an** ancient Holly on a rock outcrop in denser woodland, with ***Mycoporum lacteum*** and also *Taeniolella toruloides* parasitising *Thelotrema lepadinum*.

**NY370 063**
**Species of Interest**

| | | |
|---|---|---|
| *Mycoporum lacteum* | Ix | |
| *Porina borreri* | Ix | Below RDN031 (NY3704 0638, 150m) Coll. Spores to seven septate, 26 – 30 x 4µm. Herb. Sanderson 2657. New to Westmorland |
| *Taeniolella toruloides* | Ix, Z1410 | |
| *Thelotrema lepadinum* | Ix | |

**Other Species**

| | |
|---|---|
| *Arthonia cinnabarina* | Co |

**A2.4 Nab Scar**

In early evening, made a dash along to Nab Scar to record the Wych Elm with ***Lobaria virens***. Clearly the potential for more lichen interest, here, in an under grazed pasture woodland of frequent veteran Oak and locally veteran Holly. Much looked very acidified in passing, however.

**RDN033** (NY35428 06735, 177m): ancient Wych Elm tree on wooded scree

| | |
|---|---|
| ***Lobaria virens*** | Ug, Sax |
| Also | |
| *Agonimia tristicula* | Ug |

| | |
|---|---|
| *Collema flaccidum* | Ug, Sax |
| *Leptogium lichenoides* | Ug |
| Sessile Oak below | |
| ***Phyllopsora rosei*** | Q |

## A3 Rydal Park BLS Survey 6/9/2019

### A3.1 Weather

Some surveying was done before the rain arrived

### A3.2 Campsite

Neil looked further trees in the campsite by the pod he was staying in.

**RDN033** (NY36806 06384, 73m) smaller post-mature Sessile Oak by Pod 1

| | | |
|---|---|---|
| ***Phyllopsora rosei*** | Q | Q |
| Also | | |
| *Bacidia biatorina* | Q | |
| *Bacidia rubella* | Q | |
| *Lecanora expallens* | Q | |
| *Lopadium disciforme* | Q | |
| *Megalaria pulverea* | Q | |

### A3.3 Lower Park

Neil Sanderson looked briefly at the north east of the northern field of the Lower Park not looked at on the first day, but did not find anything significant.

Vince Giavarini looked at the north western field on the lower park, west of the Rydal Beck, adding lots of lichenicolous fungi

**NY3605**

| | |
|---|---|
| *Corticifraga fuckelii* | Z1043, XBw On *Peltigera hymenina* on boundary wall top N from Rydal Bridge. New Northern England. |
| *Hawksworthiana peltigericola* | Z1043, XBw On *Peltigera hymenina* on boundary wall top N from Rydal Bridge. New Northern England. |

**NY366 060**

**NY36625 06042** [inform VG corrected from NY4662506042] An Ash a few metres from the boundary wall

| | |
|---|---|
| *Heterocephalacria physciacearum* | Fx, Z1120 On *Physcia tenella* |
| *Tubeufia heterodermiae* | Fx, Z1120 On *Physcia tenella*. New to Northern England |
| *Unguiculariopsis thallophila* | Fx, Z0639. New to Westmorland |
| *Xanthoriicola physciae* | Fx, Z1530. New to Westmorland |

**NY36635 06075**

| | |
|---|---|
| *Peltigera horizontalis* | Q |
| *Scutula epiblastematica* | Q, Z1042 Trees on knoll on *Peltigera horizontalis*. New to Northern England & third British record |

**NY3663 0607**

| | |
|---|---|
| *Illosporiopsis christiansenii* | Q, Z0511, Z1020 On *Evernia prunastri* & *Melanelixia subaurifera* on Oak, occasional |

## A4 Other Areas

Records made during the meeting off the main target areas

### A4.1 Vince Giavarini

04/09/19 woodland rear of Hall on young trees

**NY3605**

| | | |
|---|---|---|
| *Stigmidium microspilum* | Fg, Z0533 | Fg on *Graphis scripta* |

5/9/2019 Birk Hagg

**NY365 068**

| | |
|---|---|
| *Arthrorhaphis aeruginosa* | Q, *Cladonia* sp |

### A4.2 Steve Price

Environs of Rydal Hall

**NY36670633**

| | |
|---|---|
| **Species of Interest** | |
| *Cetrelia olivetorum* s. lat. | Ti |
| *Lecanora jamesii* | Ti |
| **Other Species** | |
| *Arthonia radiata* | Ti |
| *Flavoparmelia caperata* | Ti |
| *Melanelixia glabratula* | Ti |
| *Opegrapha atra* | Ti |
| *Pertusaria leioplaca* | Ti |

# ANNEX 2 Species Lists

## General Key

**Species**

s. str. = In the strict sense, a recently split up species, recorded in the new tighter definition
s. lat. = In the loose sense, a species previously recorded on a wider definition than now and subsequently split up
Text = Saxicolous sp, which is also epiphytic

**SOWI**

1 = Species used to calculate the Southern Oceanic Woodland Index (based on the former NIEC with minor modifications)

**URI**

1 = Species used to calculate the Upland Rainforest Index (based on the former EUOCIEC with moderate modifications)

**Conservation Status**

VU = Vulnerable Red Data Book species
NT = Near Threatened Red Data Book species
Nb = Notable species (NR, NS or IR species of conservation significance not RDB NT or higher)
NR = Nationally Rare
NS = Nationally Scarce
IR = International Responsibility species
S41 = Section 41 species
[NS] = Nationally Rare lichenicolous fungi (fungal parasite of a lichen), likely to be very under recorded
[NS] = Nationally Scarce lichenicolous fungi (fungal parasite of a lichen), likely to be very under recorded
(NS) = Nationally Scarce species not regarded as a Notable species, an under recorded or ruderal species of limited conservation significance
(NR) = Nationally Rare species not regarded as a Notable species, an under recorded or ruderal species of limited conservation significance
NE = Not evaluated
21 = Score passes SSSI criteria

**Substrates**

Al = Alder, Ap = Sycamore, Bt = Birch, Cf = Conifer, Co = Hazel, Cs = Sweet Chestnut, Fg = Beech, Fx = Ash, Ix = Holly, Lx = Larch, P = Pine, Q = Oak, Sb = Rowan, Ug = Wych Elm, L = Lignum (as prefix), Tw = twigs & branches, WT = Worked Timber, SS = Siliceous rock, XBw = Boundary wall, Terr = Terricolous, + = No substrate recorded, assumed to be corticolous.

**Hosts for lichenicolous fungi**

Z0408 = *Cladonia polydactyla* var. *polydactyla*, Z0511 = *Evernia prunastri*, Z0533 = *Graphis scripta*, Z0578 = *Hypocenomyce scalaris*, Z0582 = *Hypogymnia physodes*, Z0614 = *Lecania cyrtellina*, Z0639 = *Lecanora chlarotera*, Z0643 = *Lecanora conizaeoides* f. *conizaeoides*, Z0820 = *Lepraria incana* s. lat., Z0987 = *Flavoparmelia caperata*, Z0988 = *Xanthoparmelia conspersa*, Z0997 = *Melanelixia glabratula*, Z1015 = *Parmelia saxatilis*, Z1020 = *Melanelixia subaurifera*, Z1042 = *Peltigera horizontalis*, Z1043 = *Peltigera hymenina*, Z1076 = *Pertusaria hymenea*, Z1079 = *Pertusaria leioplaca*, Z1087 = *Pertusaria pertusa*, Z1113 = *Physcia aipolia*, Z1120 = *Physcia tenella*, Z1410 = *Thelotrema lepadinum*, Z1530 = *Xanthoria parietina*, Z1629 = *Lepraria finkii*, Z2468 = *Hypotrachyna afrorevoluta*.

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | SOWI | URI | Conservation Status | New VC |
|---|---|---|---|---|---|---|---|---|---|
| **Tree Habitats** | | | | | | | | | |
| Abrothallus bertianus | Q, Z0997 | | | | | | | [NS] | 1 |
| Abrothallus microspermus | Q, Z0987 | Al Tw, Z0987 | | Q Z0987 | | | | [NS] | 1 |
| Acrocordia gemmata | | | Q | Fx | | | | | |
| Agonimia flabelliformis | | | Q | | | 1 | | Nb (NR) | 1 |
| Agonimia octospora | | Q | Q | | | 1 | | NT (NS/IR) | 1 |
| Agonimia tristicula | Fx | Q | | Fx | Ug | | | | |
| Amandinea punctata | Q | Q, Ap | | Fx | | | | | |
| Anisomeridium biforme | | Ix | | | | | | | |
| Anisomeridium polypori | Ap | Fx | | Fx | | | | | |
| Anisomeridium ranunculosporum | | Ix, Q | Q, Ix | Al, Q, Fx, Co, Ix | | 1 | | | |
| Aquacida viridifarinosa | Q | | Q | | | | | | |
| Arthonia cinnabarina | | | | Co | | | | | |
| Arthonia didyma | | | | Co | | | | | |
| Arthonia digitatae | | | Cf, Z0408 | | | | | [NR] | 1 |
| Arthonia elegans | | | | Co | | | | | |
| Arthonia punctiformis | Co | | | | | | | | |
| Arthonia radiata | Ap, Sb, Co, Ct Tw | Ix | | Co, Ct, Q | | | | | |
| Arthonia spadicea | Q | Q | | Al, Co | | | | | |
| Arthonia vinosa | Q | Q | Q | Q | | 1 | | | |
| Arthopyrenia analepta | Ct Tw | | | Q Tw | | | | | |
| Arthrorhaphis aeruginosa | LQ, Cladonia sp | | LQ, Cladonia sp | Q, Z0408 | | | | Nb (NS) | |
| Bacidia biatorina | Q | Q, Ix | Q | Fx, Ae | | 1 | | | |
| Bacidia rubella | Q, Ap | Fx, LFx, Q | Q | Fx, LFx | | | | | |
| Bacidia subincompta | | | | Fx | | | | VU (NS/S41) | |
| Biatora vernalis | | | | Q | | | | Nb (NS) | 1 |
| Bryobilimbia sanguineoatra | | | | Q | | | 1 | Nb (NS) | |
| Buellia griseovirens | | LQ | | Fx, Q Tw, Fx Tw | | | | | |
| Buellia schaereri | Cf | | | | | | | | |
| Burgoa angulosa | | | | Fx | | | | NE | ? |
| Calicium glaucellum | Q | Lal | LQ | | | | | | |
| Calicium lenticulare | | | Q | | | | 1 | Nb (NS/IR) | 1 |
| Calicium viride | Q | | | | | | | | |
| Caloplaca alstrupii | | | | Fx | | | | (NR) | 1 |
| Caloplaca asserigena | Q Tw | | | | | | | Nb (NS) | |
| Caloplaca herbidella s. str. | Q | | | | | | | VU (NR/S41) | 1 |
| Caloplaca obscurella | Q | | | | | | | | |
| Caloplaca ulcerosa | Fx | | | Fx | | | | | |
| Catillaria nigroclavata | | | | Fg Tw | | | | (NS) | |
| Catinaria "isidioides" | Q | | | | | | | NA (NR) | |
| Candelariella xanthostigmoides | Q Tw | | | Q Tw, Fx | | | | | |
| Cetrelia cetrarioides | Q, Fx | Ap Tw | Q | Fx, Q | | 1 | 1 | | |
| Cetrelia olivetorum s. str. | Q | | | | | | | (NR) | |
| Chaenotheca ferruginea | | | | Q | | | | | |
| Chaenotheca brunneola | | | LQ | LQ, Q | | 1 | | | |
| Chaenotheca chrysocephala | | | | Q | | 1 | | | |
| Chaenotheca trichialis | | | | Q | | 1 | | | |
| Chaenothecopsis nigra | | Lix | LQ | | | | | Nb (NS) | |
| Chrysothrix candelaris | + | Q | | Q | | | | | |
| Chrysothrix flavovirens | Cs, Ae | Q, LQ | Ap, Q | Q | | | | | |
| Cladonia caespiticia | | | Q | Al | | 1 | | | |
| Cladonia coniocraea | Q | LQ, Q | Q | Al, Q, LQ | | | | | |
| Cladonia cryptochlorophaea | Q | | | | | | | (NS) | |
| Cladonia cyathomorpha | Q | | | | | | | Nb (NS) | |
| Cladonia digitata | Cs, LQ, Ae | Al | LQ, Q | Q, LQ | | | | | |
| Cladonia diversa | LQ | | | | | | | | |
| Cladonia fimbriata | | | Q | | | | | | |
| Cladonia floerkeana | LQ | | | | | | | | |
| Cladonia ochrochlora | LQ | | | | | | | | |
| Cladonia parasitica | LQ | Lix | LQ | LQ | | 1 | | | |
| Cladonia polydactyla var. polydactyla | Lx, Cs, Q, Ae | Al, LQ | LQ, Cf | LQ | | | | | |
| Cladonia pyxidata | Q | | | Fx | | | | | |
| Cladonia ramulosa | LQ | | | Q | | | | | |
| Cladonia squamosa var. subsquamosa | | | LQ | | | | | | |
| Cladophialophora parmeliae | | | | Fx Tw, Z2468 | | | | [NR] | 1 |
| Cliostomum griffithii | | Q | | Q | | | | | |

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | SOWI | URI | Conservation Status | New VC |
|---|---|---|---|---|---|---|---|---|---|
| Clypeococcum hypocenomycis | | | Cf, Z0578 | | | | | | 1 |
| Collema flaccidum | + | | Ap | | Ug | | | | |
| Cyrtidula quercus | Q Tw | | | | | | | | |
| Dactylospora parasitica | Q, Z1076 | | | | | | | [NS] | 1 |
| Dendrographa decolorans | | Q | Q | Q | | | | | |
| Dimerella pineti | Q | | | Q | | | | | |
| Enterographa crassa | | Ix | | | | | | | |
| Eopyrenula avellanae | | | | Co | | | | Nb (NS/IR) | 1 |
| Evernia prunastri | Q Tw, Q | Q | | Q Tw | | | | | |
| Flavoparmelia caperata | Fx, Q, Q Tw | Q Tw, Q, Al Tw, Al | Q | Q, Q Tw | | | | | |
| Francisrosea bicolor in ed. | | | Q | | | | | (NR) | |
| Fuscidea lightfootii | Q Tw, Lx | Al Tw | | Q Tw, Fg Tw, Fx Tw | | | | | |
| Graphis elegans | | Ix | Ix | Q Tw, Ct, Al | | | | | |
| Graphis scripta | Co | | Sb | Al Tw, Co, Fg, Q, Fx | | | | | |
| Gyalecta flotowii | | | | Fx | | | | NT (NS) | |
| Gyalecta truncigena | | Q | | LFx, Fx | | | | | |
| Halecania viridescens | | | | Fg Tw | | | | (NS) | 1 |
| Heterocephalacria physciacearum | Fx, Z1120 | | | | | | | [NS] | |
| Homostegia piggotii | Fx, Q Tw, Z1015 | | | | | | | | 1 |
| Hyperphyscia adglutinata | Q | | | | | | | | |
| Hypocenomyce scalaris | Lx, Q, Cs, Ae | Q, Al | LQ, Cf | Q | | | | | |
| Hypogymnia physodes | Lx, Q Tw | Al Tw | LQ | Q | | | | | |
| Hypogymnia tubulosa | Q Tw, WT, Lx | | | Q Tw | | | | | |
| Hypotrachyna afrorevoluta | Q Tw, Q, Lx | Al Tw, Al | | Q Tw, Co, Ct, Fg Tw, Fx Tw | | | | | |
| Hypotrachyna laevigata | | | | Fx | | | 1 | | |
| Hypotrachyna revoluta s. str. | Q Tw, WT | | | | | | | | |
| Hypotrachyna taylorensis | | Q | | Fx | | | 1 | Nb (IR) | |
| Illosporiopsis christiansenii | Q Tw, Z1120 | | | | | | | [NS] | 1 |
| Imshaugia aleurites | | | LQ | | | | | | |
| Intralichen christiansenii | Q Tw, Ap, Z0614, Z0511, Z1020 | | | | | | | [NS] | 1 |
| Lecanactis abietina | | | Q | Q | | | | | |
| Lecania cyrtellina | Ap | | | Fx | | | | | 1 |
| Lecanora argentata | Q | | | Fx | | | | (NS) | |
| Lecanora carpinea | Fx Tw | | | | | | | | |
| Lecanora chlarotera | Ap, Q, Q Tw | | | | | | | | |
| Lecanora compallens | Q | | | | | | | (NS) | |
| Lecanora conizaeoides | + | | P | | | | | | |
| Lecanora expallens | Q | Q, Al | Q | Q, LQ | | | | | |
| Lecanora hybocarpa | Fx, Q Tw | | | | | | | (NR) | 1 |
| Lecanora pulicaris | | | | Q Tw | | | | | |
| Lecanora quercicola | | Q | | | | 1 | | VU (NS/IR/S41) | |
| Lecanora strobilina | Q Lig | | | | | | | VU (NR) | |
| Lecidella elaeochroma f. elaeochroma | Fx, Sb, Ct Tw | Q, Ap | | Fg Tw, Fx | | | | | |
| Lepraria finkii | Q | | | | | | | | |
| Lepraria incana s. str. | Q | | | Q, Al | | | | | |
| Lepraria membranacea | + | Q, Al | Q, Bt | Q, Al, LQ | | | | | |
| Lepraria rigidula | | Al | | | | | | | |
| Leptogium lichenoides | | Fx | | Fx | Ug | 1 | | | |
| Leptogium subtile | | | | LFx | | | | Nb (NS) | |
| Leptogium teretiusculum | Fx, Q | | | Fx | | 1 | | | |
| Lichenochora obscuroides | Q, Z1113 | | | | | | | [NR] | 1 |
| Lichenoconium erodens | Q, Z0511, Z1022 | | | | | | | | |
| Lichenoconium lecanorae | | | P, Z0643 | | | | | [NS] | 1 |
| Lichenodiplis pertusariicola | Ap, Z1087, Z1078 | | | | | | | | |
| Lichenomphalia umbellifera | | | | LQ | | | | | |
| Lobaria pulmonaria | Q | Q, Ap | | | | 1 | | Nb (IR) | |
| Lobaria virens | | Ap | | | Ug | 1 | | Nb (IR) | |
| Lopadium disciforme | Q | Q | Q | Fx, Q | | | 1 | | |
| Loxospora elatina | | Q | | | | 1 | 1 | | |
| Marchandiomyces corallinus | Co, Lx, Z1015, Z1079 | Q, Fx, Co, Z1015, Z1113 | | Q Tw, Fx Tw, Z1015, Z1020, Z0511 | | | | | |
| Megalaria pulverea | | Q | Q | Al, Fx, Al | | | 1 | | |
| Melanelixia glabratula | Q, Fx, Lx | Al, Fg, Q | Q | Ae, Co, Fx, Q | | | | | |
| Melanelixia subaurifera | Q Tw, WT | Ap Tw | | Q Tw | | | | | |
| Melanohalea elegantula | Q Tw | Q Tw | | Q Tw | | | | | |

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | SOWI | URI | Conservation Status | New VC |
|---|---|---|---|---|---|---|---|---|---|
| Melanohalea exasperatula | Q Tw | | | | | | | | |
| Melanohalea laciniatula | Q | | | | | | | | |
| Melaspilea ochrothalamia | | | Ix | | | | | Nb (NS) | |
| Micarea byssacea s. lat. | | | | LFx | | | | | 1 |
| Micarea coppinsii | WT | | | Fx Tw, LQ, SS | | | | | |
| Micarea doliiformis | Q | Q | Q | Q, Q | | | 1 | Nb (NS) | 1 |
| Micarea leprosula | LQ | | LQ | | | | | | |
| Micarea lignaria var. lignaria | LQ, WT | | | Fx, Al, SS | | | | | |
| Micarea melaena | | | LQ | | | | | | |
| Micarea misella | Nb (NS) | | | | | | | Nb (NS) | |
| Micarea peliocarpa | | LQ | Q | LQ, Q | | | | | |
| Micarea prasina s. lat. | + | | Q | Q | | | | | |
| Micarea stipitata | | | Q | Q | | | 1 | Nb (IR) | |
| Micarea viridileprosa | Q | | | Al | | | | (NS) | |
| Micarea xanthonica | | | Q | | | | | Nb (NS/IR) | |
| Microcalicium ahlneri | | LQ | | | | | | Nb (NS) | 1 |
| Mycobilimbia epixanthoides | Q | Q | Q | Fx | | 1 | | | |
| Mycobilimbia pilularis | | | Q | Fx | | 1 | | | |
| Mycoblastus caesius | | Q | Q | | | | 1 | | |
| Mycoblastus sanguinarius | Q | | | | | | 1 | | |
| Mycoporum antecellens | | Ix | | | | 1 | | | |
| Mycoporum lacteum | | Ix | | Ix | | | | NT (NS) | |
| Nigromacula uniseptata | | | | Fx Tw, Z2468, | | | | [NS] | 1 |
| Normandina pulchella | Ap, Q | Q | Q | Co, Fx, Q | | | | | |
| Ochrolechia androgyna | Q, SS | Q | Q | Fx, Q, SS | | | | | |
| Ochrolechia subviridis | Q, Fx | Q | Q | Q, Fx | | | | | |
| Opegrapha atra | Q | Ix | | Co | | | | | |
| Opegrapha herbarum | | | | Fx | | | | | |
| Opegrapha niveoatra | Ap | | | | | | | | |
| Opegrapha ochrocheila | | | | Fx | | | | | |
| Opegrapha varia | Ap | | | Fx, Ae | | | | | |
| Opegrapha vulgata | Ap, Fx | Fx, Ix | | Co | | | | | |
| Pachyphiale carneola | Q | Q | Q | Q, Co | | 1 | | | |
| Pannaria conoplea | Q | Q | | Fx | | 1 | | Nb (IR) | |
| Paranectria oropensis subsp. oropensis | Q, Z1629 | | | Fx, Z0820 | | | | [NS] | 1 |
| Parmelia saxatilis s. lat. | Q, Fx, Lx, SS, WT, Ae | Q Tw, Q, Al | | Q, Q Tw, Fx Tw | | | | | |
| Parmelia sulcata | Q Tw, WT, Q, Ae | | | Q Tw | | | | | |
| Parmeliella parvula | | | Q | | | 1 | | Nb (IR) | |
| Parmeliella triptophylla | | Q | Q | Fx | | 1 | | Nb (IR) | |
| Parmelina pastillifera | Fg Tw | | | | | | | | |
| Parmeliopsis ambigua | Lx | | | | | | | | |
| Parmeliopsis hyperopta | | LQ | | | | | | | |
| Parmotrema crinitum | Q | Q | | | | 1 | | | |
| Parmotrema perlatum | Q | Al Tw | | | | | | | |
| Peltigera collina | Q | | | | | 1 | | Nb (IR) | |
| Peltigera horizontalis | Q | Fx | Ap, LFg, Q | Fx, Ma, Lma | | 1 | | | |
| Peltigera hymenina | | | | Fx, SS | | | | | |
| Peltigera membranacea | | | LFg | | | | | | |
| Peltigera praetextata | + | | | Fx | | | | | |
| Pertusaria albescens var. albescens | Q | | | | | | | | |
| Pertusaria albescens var. corallina | Q | Ap, Q | | | | | | | |
| Pertusaria amara f. amara | Q | Q | | | | | | | |
| Pertusaria coccodes | Q | | | | | | | | |
| Pertusaria flavida | Q | Q | | Q | | | | | |
| Pertusaria hymenea | Ap, Q, Fx | Fx, Q, Ap | Q | Q, Fx, Co | | | | | |
| Pertusaria leioplaca | Q Tw, Co | Ix | | Co, Fg, Q | | | | | |
| Pertusaria pertusa | Ap, Q, Fx | Q | | Fx | | | | | |
| Phaeographis inusta | | | | Al Tw | | 1 | | Nb (NS/IR) | 1 |
| Phaeophyscia orbicularis | Q | | | | | | | | |
| Phaeospora parasitica | Ap, Z0614 | | | | | | | [NS] | 1 |
| Phlyctis argena | Q | Fg, Q | Q | Q, Co, Fx | | | | | |
| Phyllopsora rosei | Q | | Q | Fx | Q | 1 | | Nb (NS/IR) | |
| Physcia adscendens | Q | | | | | | | | |
| Physcia aipolia | Q Tw, Ct Tw | Fx, Co | | Q Tw | | | | | |
| Physcia tenella | Q Tw | | | Fg Tw, Q Tw | | | | | |
| Physconia distorta | Q | | | | | | | | |
| Physconia enteroxantha | Q | | | | | | | | |
| Physconia grisea | Q | | | | | | | | |
| Placynthiella icmalea | | | LQ | LQ | | | | | |

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | SOWI | URI | Conservation Status | New VC |
|---|---|---|---|---|---|---|---|---|---|
| Platismatia glauca | Lx, Q | Al Tw | | Q Tw, Fx Tw | | | | | |
| Porina aenea | Ap | | | Ae | | | | | |
| Porina borreri | Fg | | | Ix | | | | Nb (NS) | 1 |
| Porina byssophila | Ap | | | Co | | | | Nb (NS) | 1 |
| Pronectria pertusariicola | Fx, Z1087 | | | | | | | [NR] | 1 |
| Pseudoschismatomma rufescens | Ap | Fx | | Fx | | | | | |
| Punctelia jeckeri | Q Tw | Al Tw | | Q Tw | | | | | |
| Punctelia subrudecta s. str. | Q, Q Tw | | | Fg Tw | | | | | |
| Pyrrhospora quernea | Q | Ix, Q | Q | Q, Ae | | | | | |
| Ramalina farinacea | Q Tw, Q, Fx | Ap Tw | | Q Tw, Fg Tw | | | | | |
| Ramonia dictyospora | Q | | | | | | | NT (NS/IR/S41) | 1 |
| Rinodina griseosoralifera | Q | | | | | | | Nb (NS) | 1 |
| Rinodina isidioides | Q, Fx | Q | Q | | | 1 | | NT (NS/IR/S41) | |
| Rinodina roboris var. roboris | Q | Q | Q | Fx | | | | Nb (IR) | |
| Rinodina sophodes | Q Tw | | | | | | | | |
| Ropalospora viridis | | | Bt | Al | | | | | |
| Scutula epiblastematica | Q, Z1042 | Fx, Z1042 | | | | | | [NR] | 1 |
| Sphaerophorus globosus | | | | Q | | | 1 | | |
| Sphinctrina turbinata | Fx, Z1087 | | | | | | | Nb (NS) | |
| Stenocybe pullatula | | Al Tw | | Al Tw | | | | | |
| Stenocybe septata | | | Ix | | | 1 | | Nb (IR) | |
| Sticta limbata | Q | | | | | 1 | | Nb (IR) | |
| Strigula taylorii | | Ap | | | | | | Nb (NS/IR) | |
| Taeniolella punctata | | | | Co, Q, Z0533 | | | | [NR] | 1 |
| Taeniolella toruloides | | | | Ix ,Q, Fx, Z1410 | | | | [NR] | 1 |
| Thelenella muscorum var. muscorum | Fx | | | Fx | | | | | |
| Thelopsis rubella | Q, Ap | Q | Q | Fx | | 1 | | | |
| Thelotrema lepadinum | | Ix, Q | Ix, Q | Q, Fx, Ix | | 1 | | | |
| Trapelia corticola | | | Q | LQ, Q | | | 1 | | |
| Trapeliopsis flexuosa | LQ | LQ | LQ, Q | Al, Q, LQ | | | | | |
| Trapeliopsis granulosa | LQ | LQ | LQ | | | | | | |
| Trapeliopsis pseudogranulosa | LQ, Terr, SS | | | Q | | | | | |
| Tremella hypogymniae | | | P, Z0582 | | | | | [NR] | 1 |
| Tubeufia heterodermiae | Fx, Z1120 | | | | | | | [NR] | 1 |
| Unguiculariopsis thallophila | Fx, Z0639 | | | | | | | [NS] | 1 |
| Usnea cornuta | | | | Q | | | | | |
| Usnea subfloridana | | | | Q, Q Tw | | | | | |
| Usnea wasmuthii | Q Tw | | | | | | | | 1 |
| Varicellaria hemisphaerica | Q | Q | Q | Q | | | | | |
| Violella fucata | WT | | LQ | LQ, Q | | | | | |
| Vouauxiella lichenicola | Q, Z0639 | | | | | | | | 1 |
| Vouauxiella verrucosa | Ap, Z0639 | | | | | | | [NS] | 1 |
| Xanthoparmelia conspersa | SS, Fx | | | | | | | | |
| Xanthoria parietina | Ap, Q Tw, Q | Ap Tw | | Fx, Fg Tw | | | | | |
| Xanthoria polycarpa | + | | | | | | | | |
| Xanthoriicola physciae | Fx, | | | Fg Tw, Z1530 | | | | | 1 |
| **Rock Habitats** | | | | | | | | | |
| Abrothallus caerulescens | SS, Z0988 | | | | | | | [NR] | 1 |
| Arthrorhaphis citrinella | | | | SS | | | | | |
| Aspicilia caesiocinerea | SS | | | | | | | | |
| Baeomyces rufus | SS | | | | | | | | |
| Candelariella coralliza | SS | | | | | | | | |
| Candelariella vitellina f. vitellina | SS | | | | | | | | |
| Cladonia diversa | | | | SS | | | | | |
| Cladonia subcervicornis | Terr, SS | | | SS | | | | | |
| Corticifraga fuckelii | XBw, Z1043 | | | | | | | [NS] | 1 |
| Diploschistes scruposus | | | | SS | | | | | |
| Fuscidea cyathoides var. cyathoides | | | | SS | | | | | |
| Fuscidea recensa | | | | SS | | | | | |
| Haematomma ochroleucum var. porphyrium | | | | SS | | | | | |
| Hawksworthiana peltigericola | XBw, Z1043 | | | | | | | [NR] | 1 |
| Lasallia pustulata | SS | | | | | | | | |
| Lecanora gangaleoides | | | | SS | | | | | |
| Lecanora polytropa | SS | | | | | | | | |
| Lecanora soralifera | | | | SS | | | | | |
| Lecidea lithophila | | | | SS | | | | | |
| Massalongia carnosa | | | | SS | | | | | |
| Micarea coppinsii | | | | SS | | | | | |
| Micarea lignaria var. lignaria | | | | SS | | | | | |

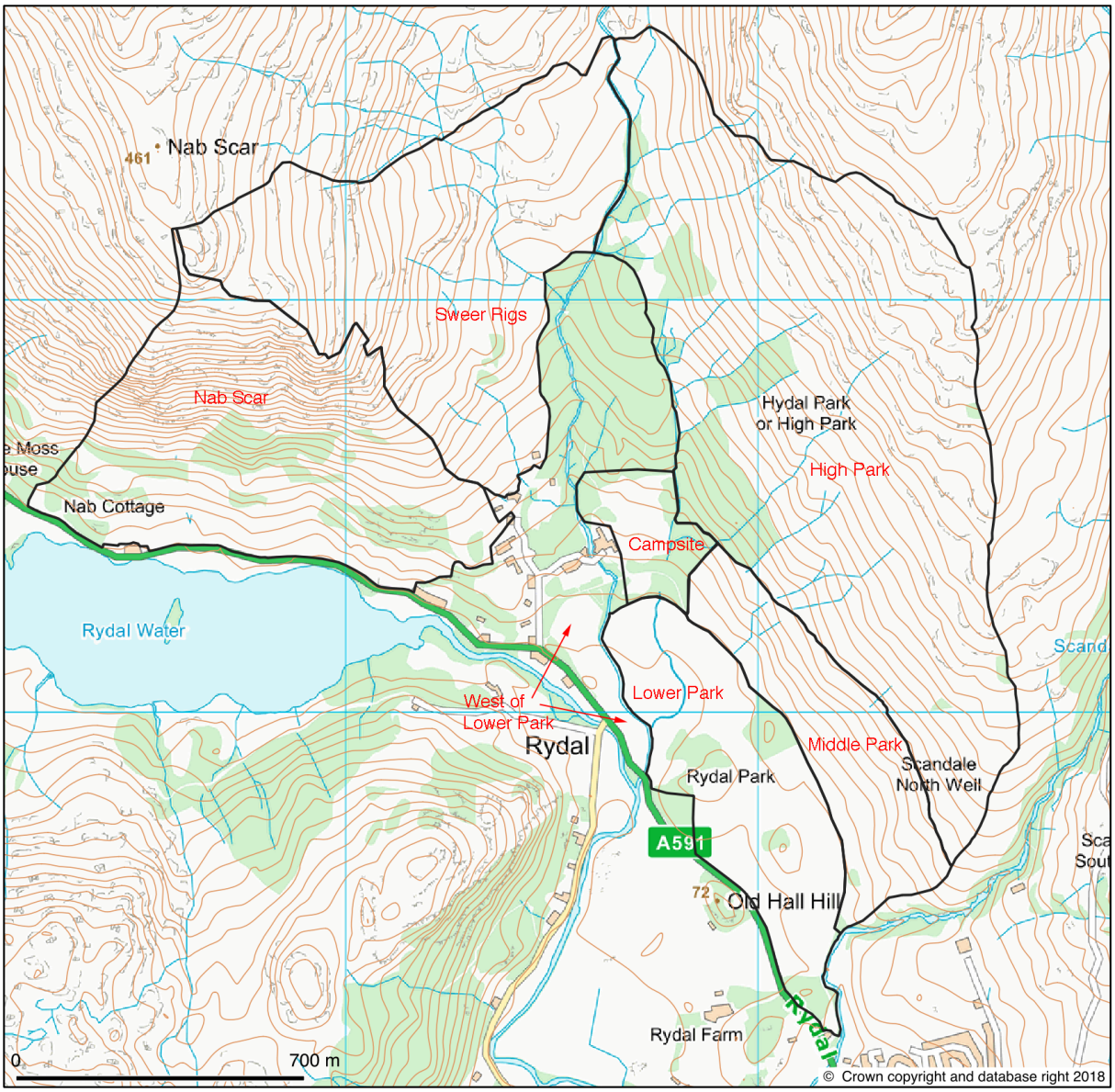
| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | SOWI | URI | Conservation Status | New VC |
|---|---|---|---|---|---|---|---|---|---|
| Ochrolechia androgyna | SS | | | SS | | | | | |
| Opegrapha gyrocarpa | | | | SS | | | | | |
| Parmelia saxatilis s. lat. | SS | | | SS | | | | | |
| Peltigera hymenina | XBw | | | SS | | | | | |
| Pertusaria aspergilla | SS | | | SS | | | | | |
| Pertusaria corallina | SS | SS | | SS | | | | | |
| Porpidia rugosa | | | | SS | | | | | |
| Porpidia tuberculosa | | | | SS | | | | | |
| Rhizocarpon geographicum | SS | | | SS | | | | | |
| Rhizocarpon lavatum | | | | SS | | | | | |
| Rhizocarpon reductum | | | | SS | | | | | |
| Sclerococcum sphaerale | | SS, Z1066 | | SS, Z1066 | | | | | |
| Stereocaulon vesuvianum var. vesuvianum | | | | SS | | | | | |
| Trapelia glebulosa s. lat. | SS | | | SS | | | | | |
| Trapeliopsis pseudogranulosa | Terr, SS | | | | | | | | |
| Varicellaria lactea | SS | | | SS | | | | | |
| Xanthoparmelia conspersa | SS | | | SS | | | | | |

| Species | Lower Park | Middle Park | Campsite | High Park | Nabb Scar | Rydal Park | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Totals** | | | | | | | | | |
| Total Epiphytic Taxa | 160 | 93 | 77 | 141 | 5 | 242 | | | |
| Additional Saxicolous Taxa | 17 | 2 | 0 | 24 | 0 | 33 | | | |
| Total Taxa | 177 | 95 | 77 | 165 | 5 | 275 | | | |
| **Biodiversity Scores** | | | | | | | | | |
| SOWI Index Scores | 16 | 21 | 20 | 21 | 3 | 34 | | | |
| URI Index Scores | 4 | 7 | 8 | 10 | 0 | 14 | | | |
| Pinhead Index | 4 | 3 | 4 | 4 | 0 | 9 | | | |
| SSSI Criteria spp | 5 | 3 | 2 | 1 | 0 | 7 | | | |
| Vulnerable | 2 | 1 | 0 | 1 | 0 | 3 | | | |
| Near Threatened | 2 | 3 | 2 | 1 | 0 | 4 | | | |
| Notable | 14 | 10 | 13 | 15 | 2 | 31 | | | |
| International Responsibility Spp | 9 | 9 | 10 | 8 | 2 | 21 | | | |
| S41 Species | 3 | 2 | 1 | 1 | 0 | 5 | | | |
| TNTN Score | 26 | 20 | 17 | 21 | 0 | 51 | | | |

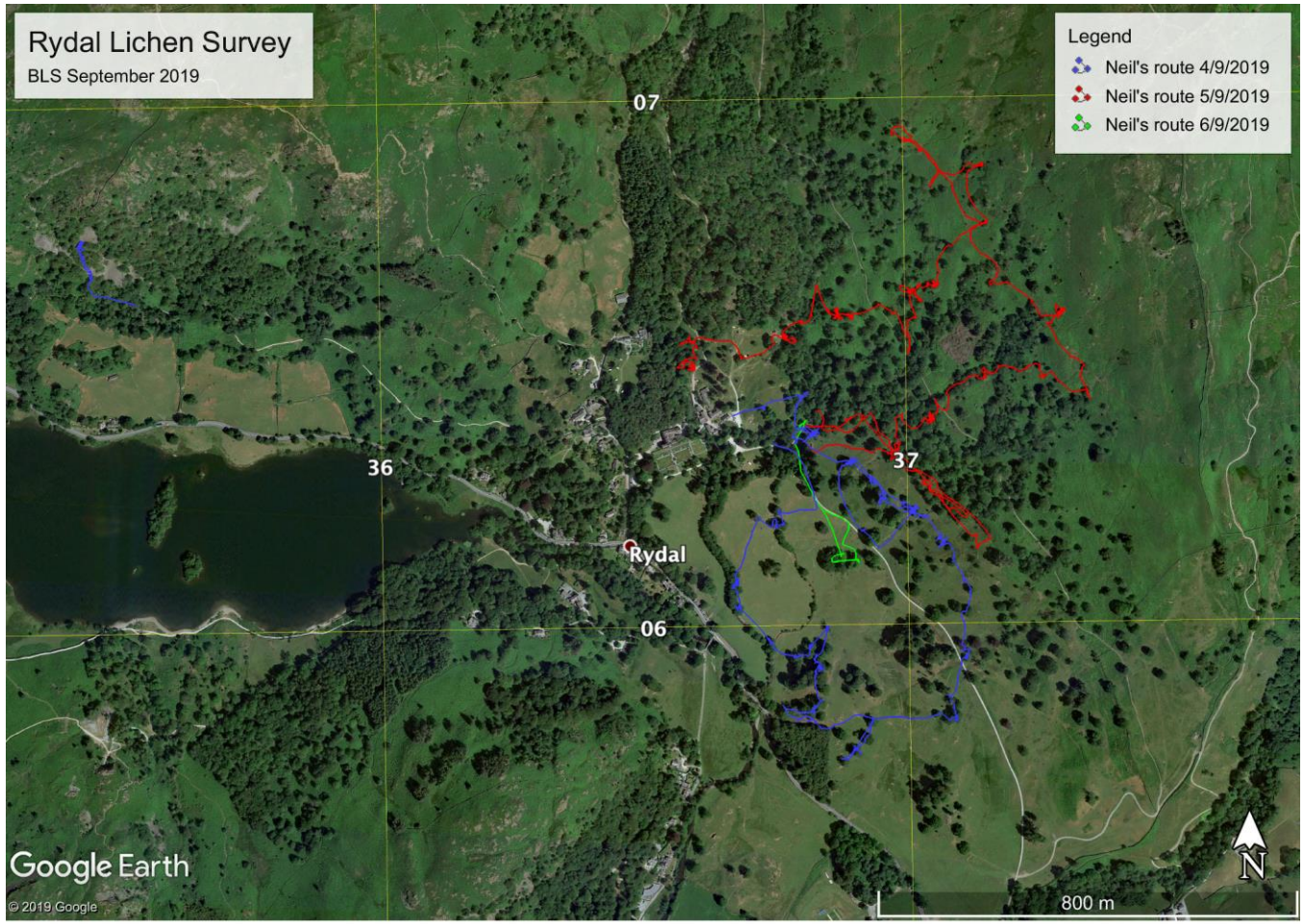
# ANNEX 3 Maps

## B1 General Maps

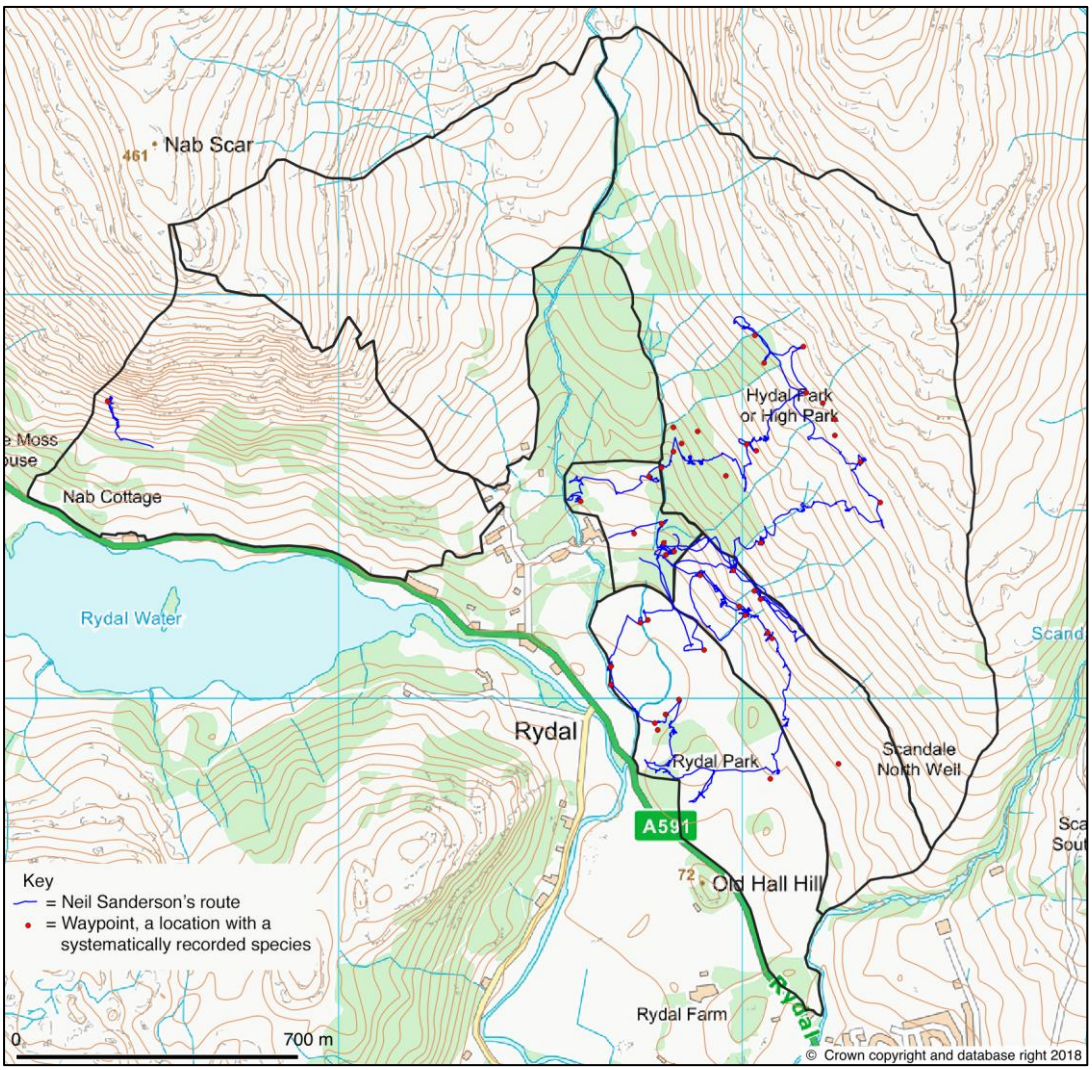
**MAP 1**
**Rydal Park 2019 Location**



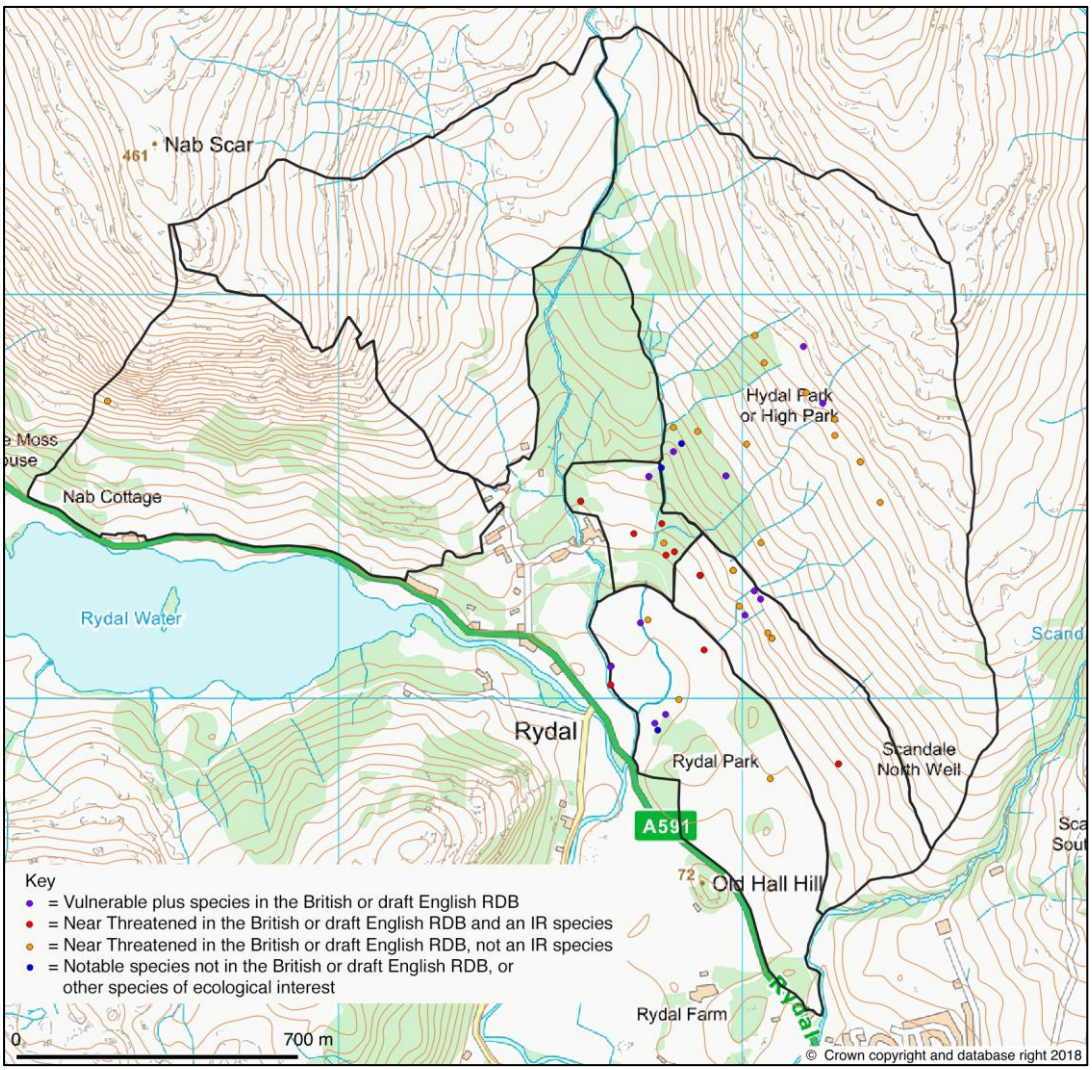
**MAP 2**
**Rydal Park 2019 Neil Sanderson's Survey Route**



**MAP 3**
**Rydal Park 2019 Neil Sanderson's Survey Route & Waypoints**



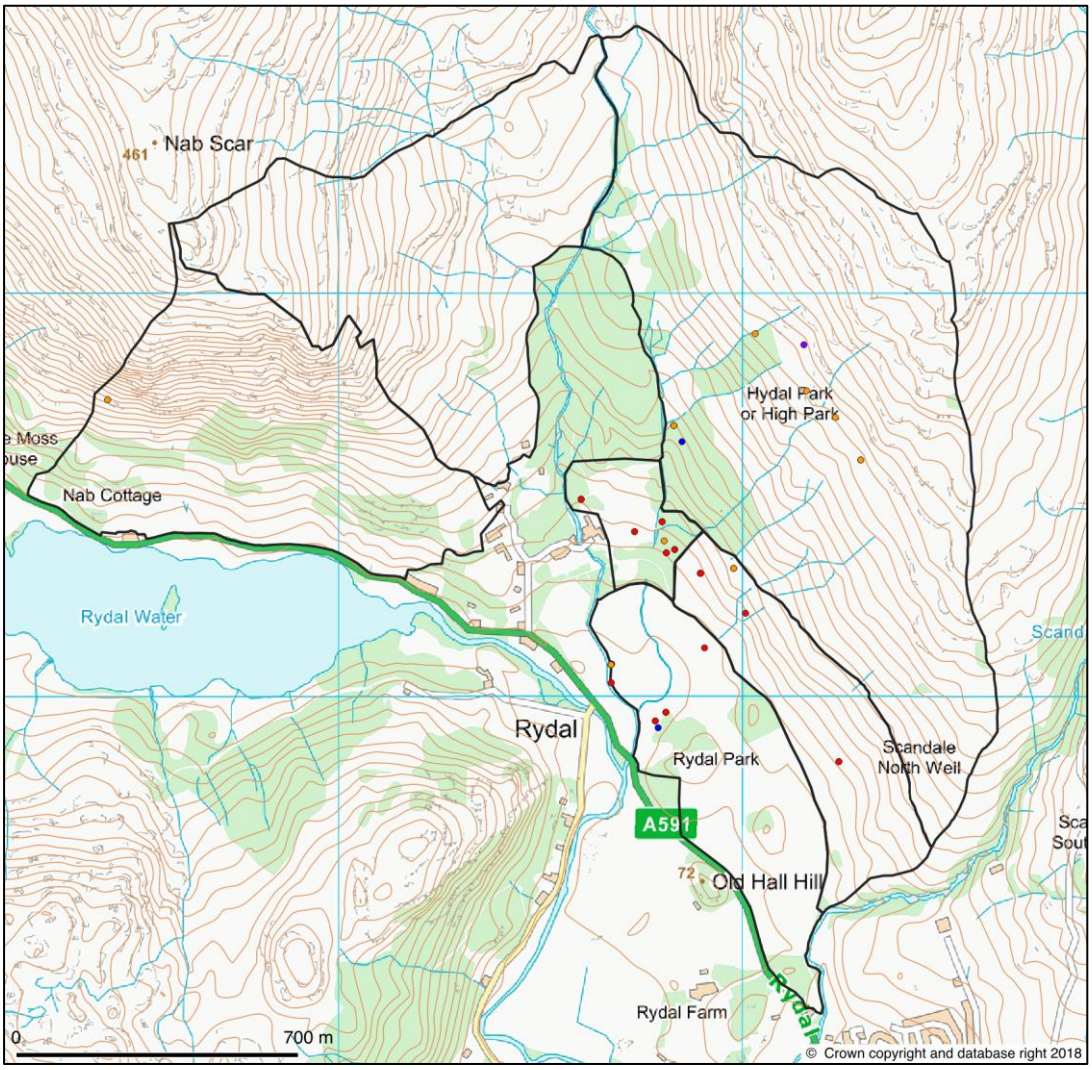
**MAP 4**
**Rydal Park 2019 Conservation Value**



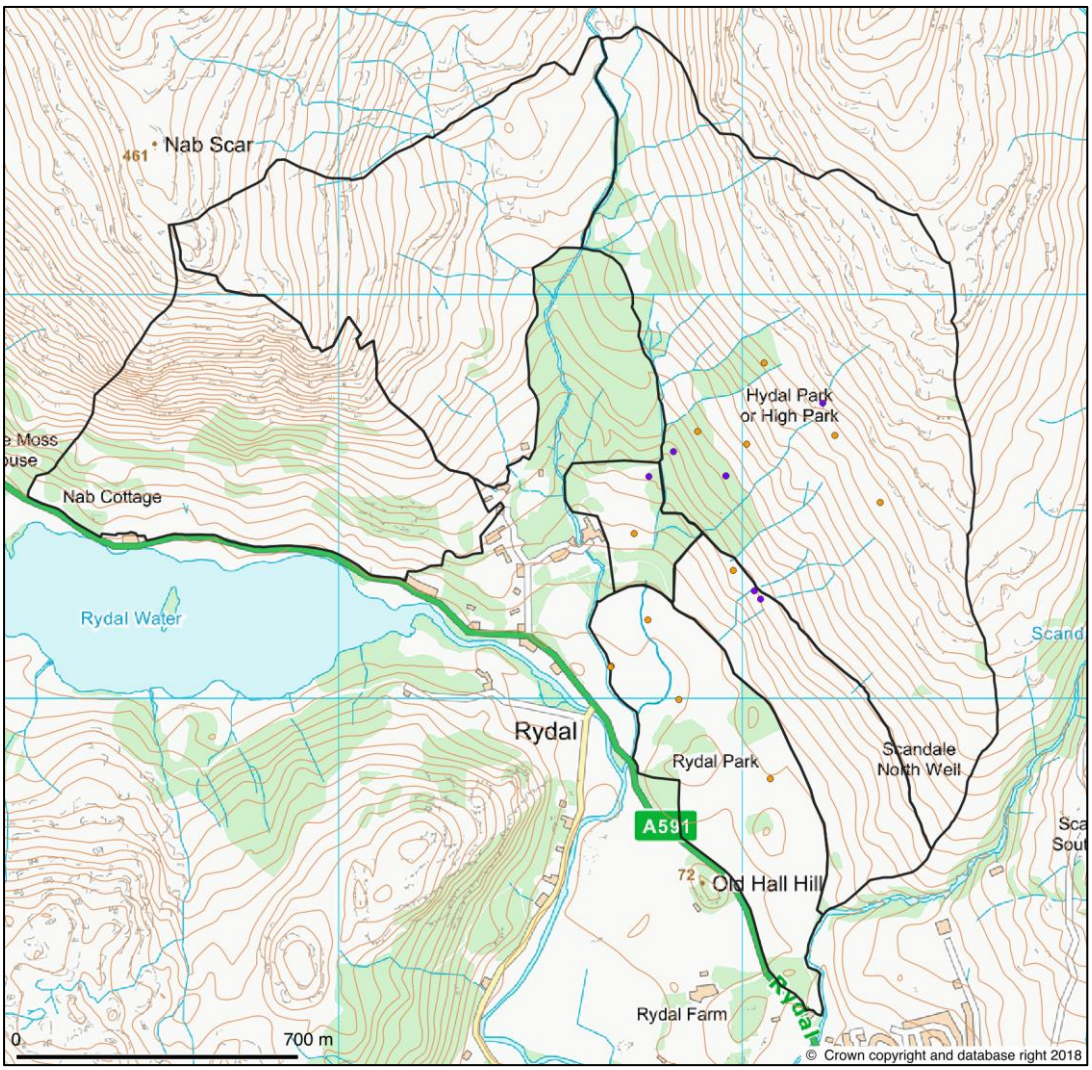
## B2 Lichen Assemblage Maps

Key as **Map 4**

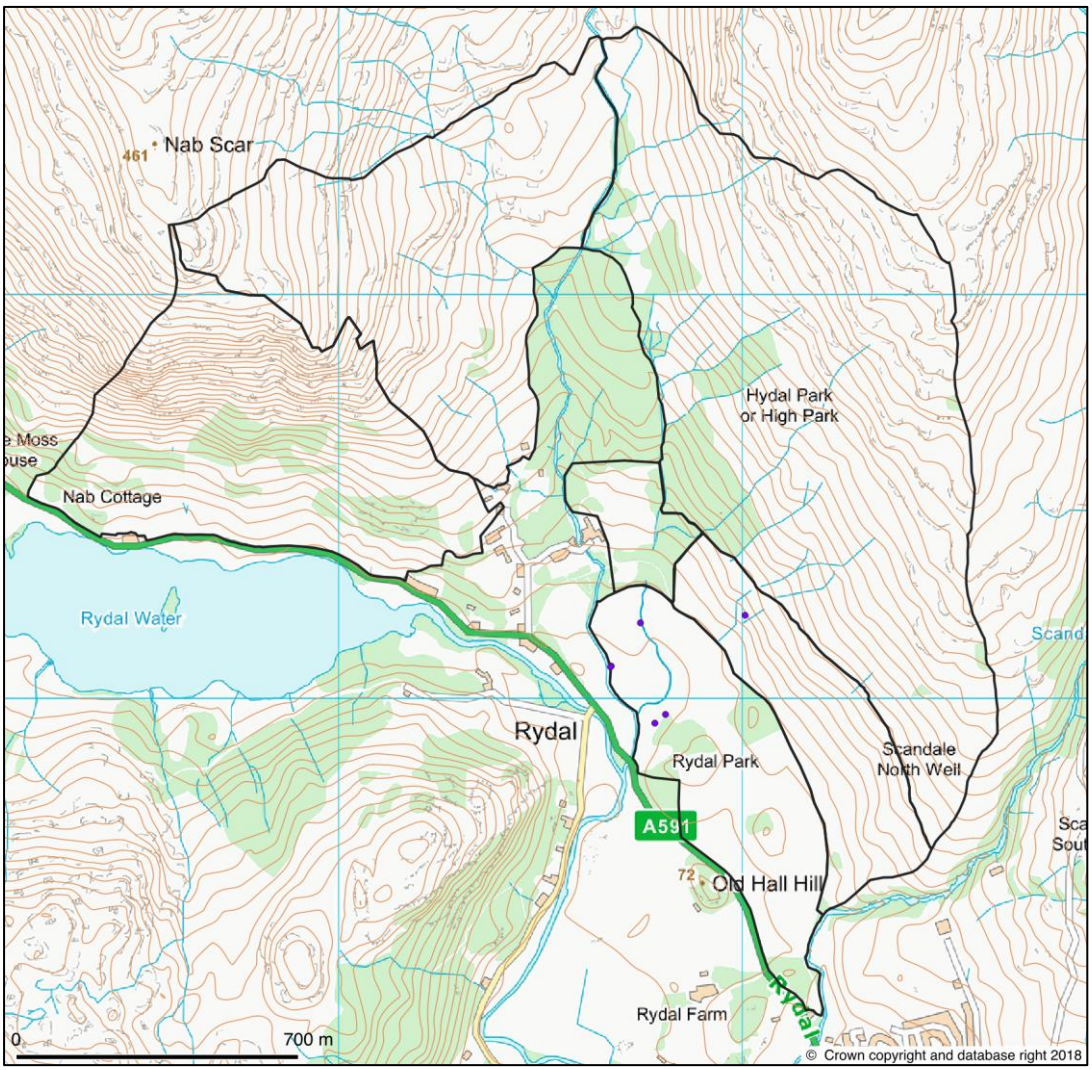
**MAP 5**
**Rydal Park 2019 Woodland Base Rich Bark Assemblage**



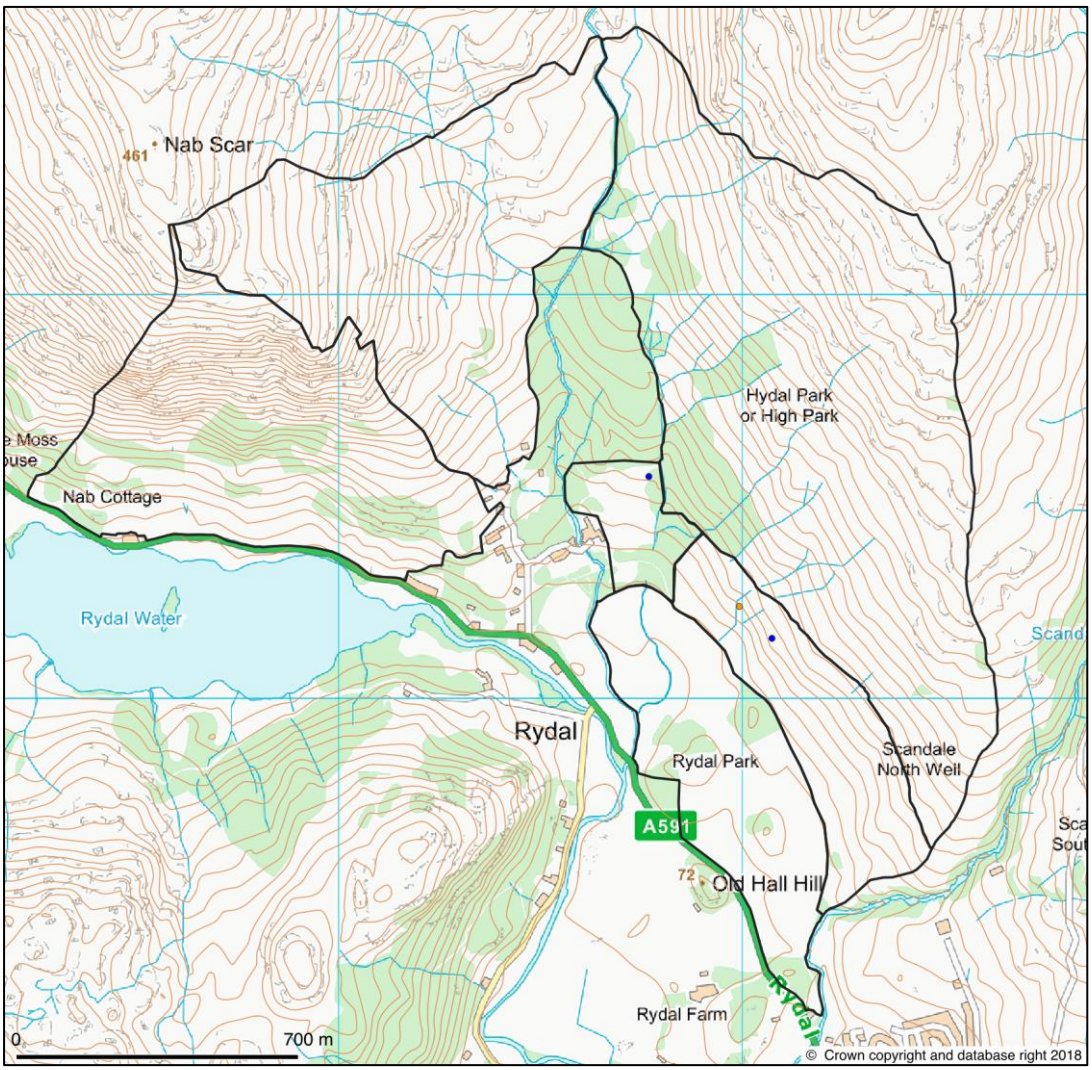
**MAP 6**
**Rydal Park 2019 Woodland Acid Bark Assemblage**



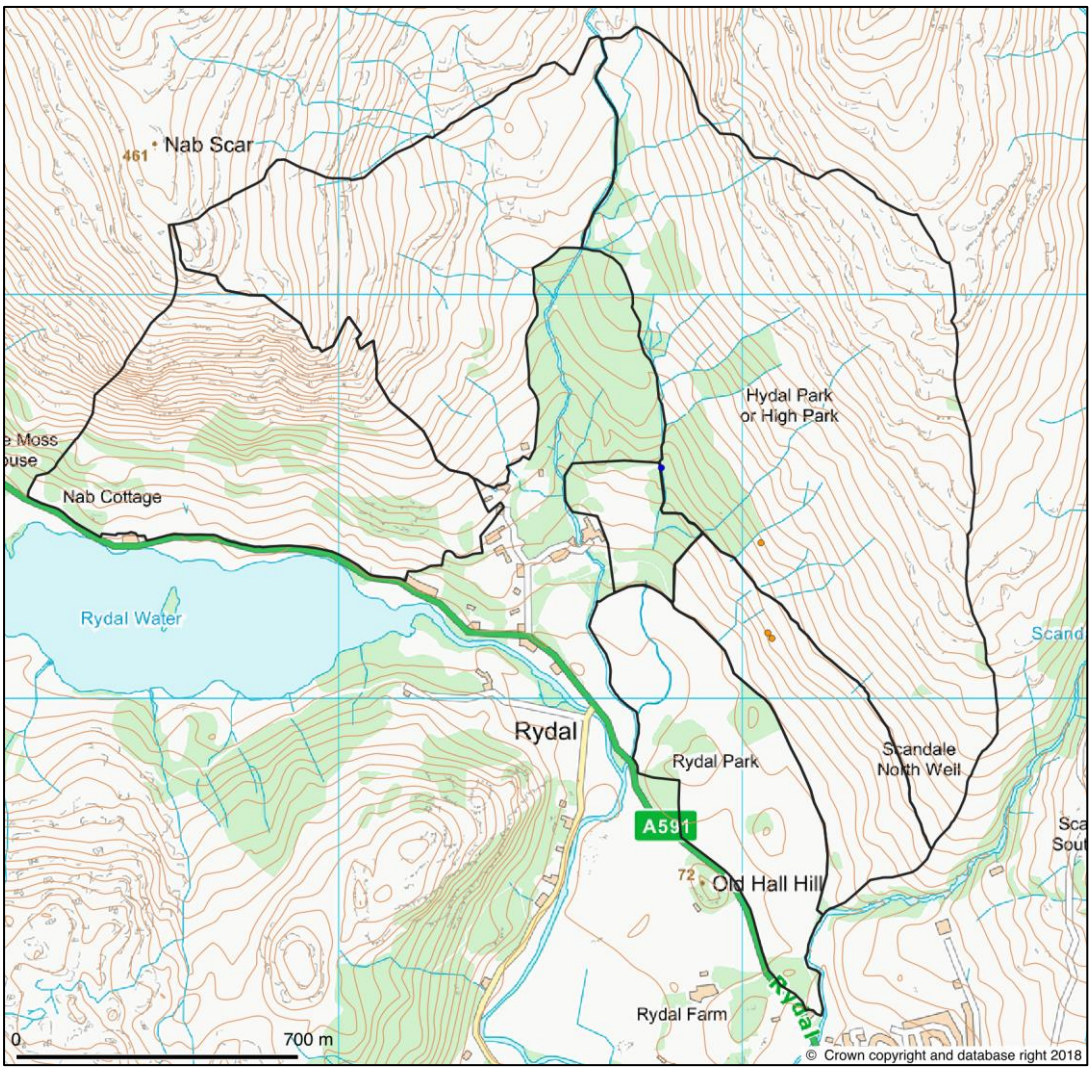
**MAP 7**
**Rydal Park 2019 Parkland Mesic to Rich Bark Assemblage**



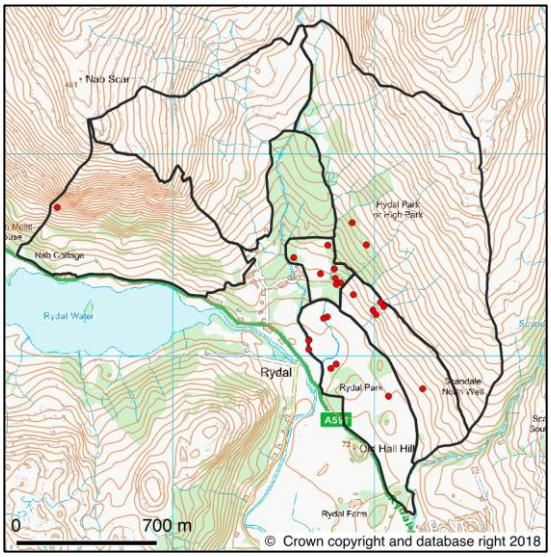
**MAP 8**
**Rydal Park 2019 Lignum Assemblage**



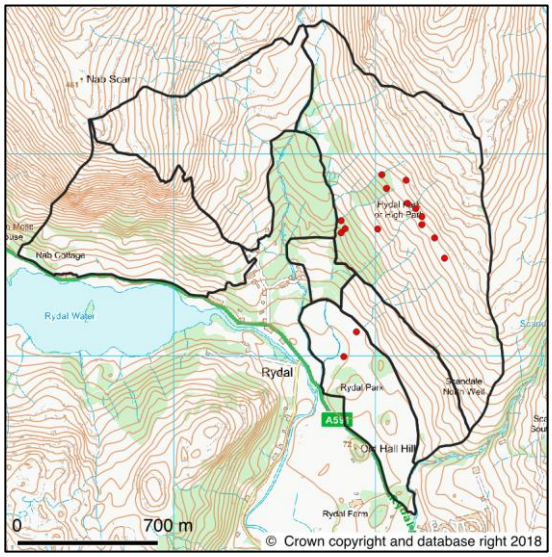
**MAP 9**
**Rydal Park 2019 Smooth Bark Assemblage, on Old Hollies**



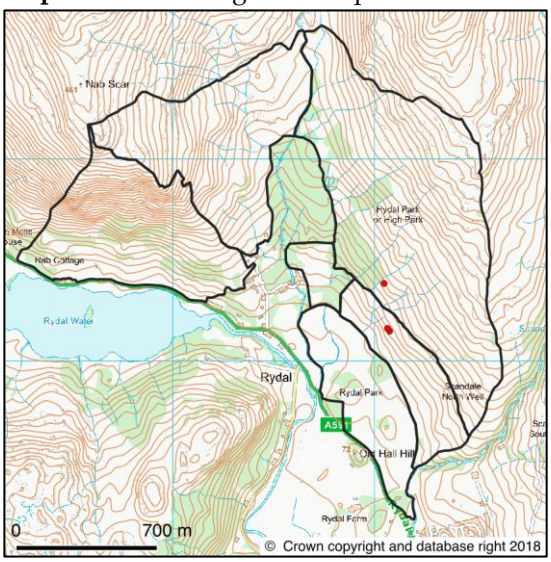
## B3 Habitat Maps



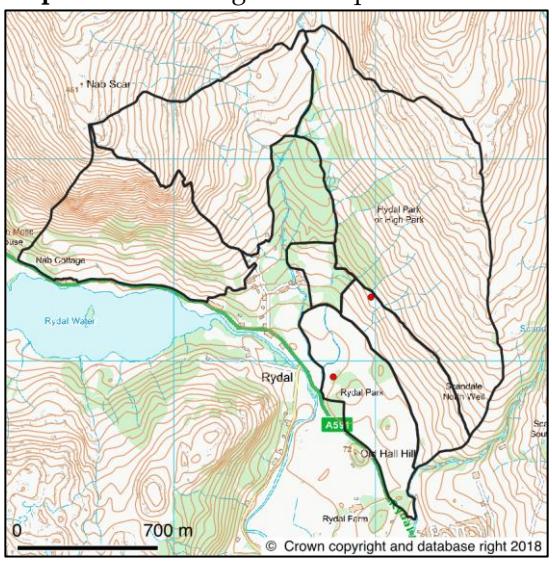

**Map 10** Oak with significant species



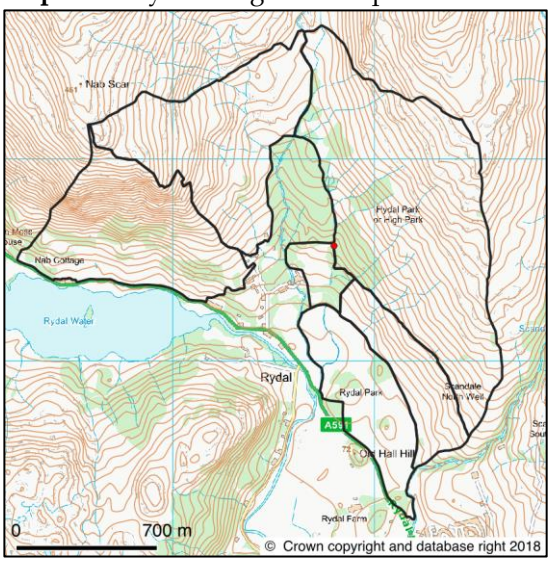

**Map 11** Ash with significant species



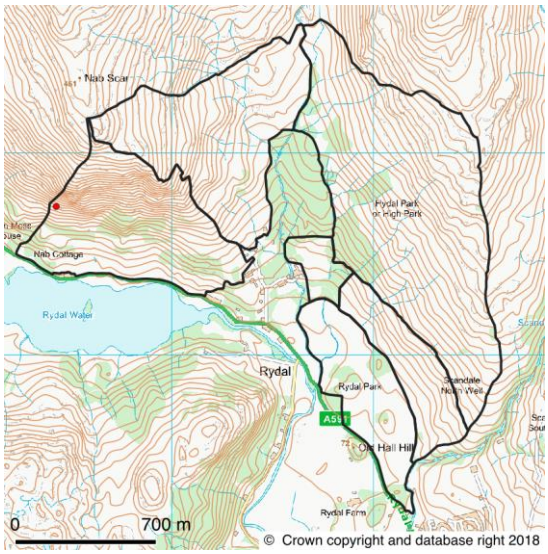

**Map 12** Holly with significant species




**Map 13** Sycamore with significant species

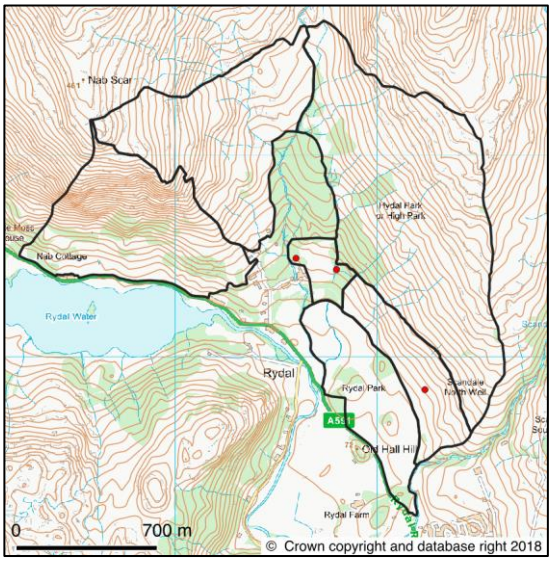



**Map 14** Alder with significant species

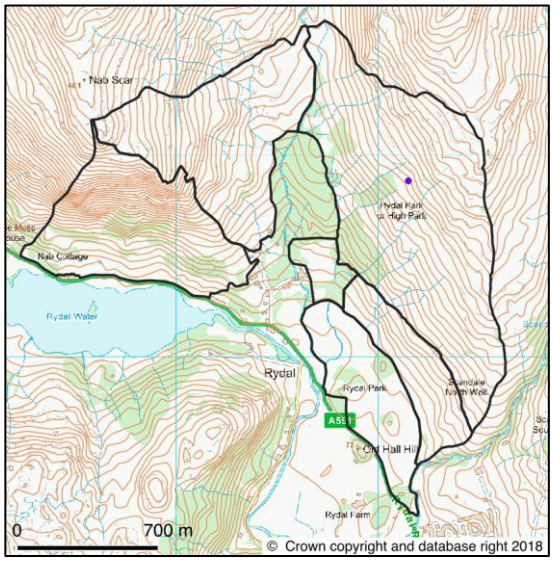



**Map 15** Wych Elm with significant species

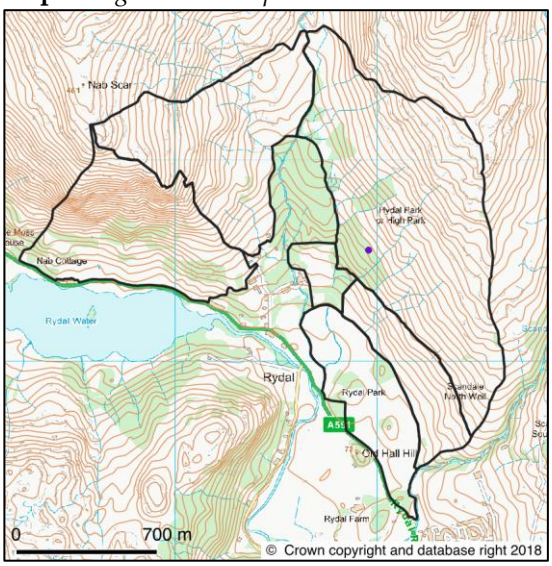
## B4 Species Maps



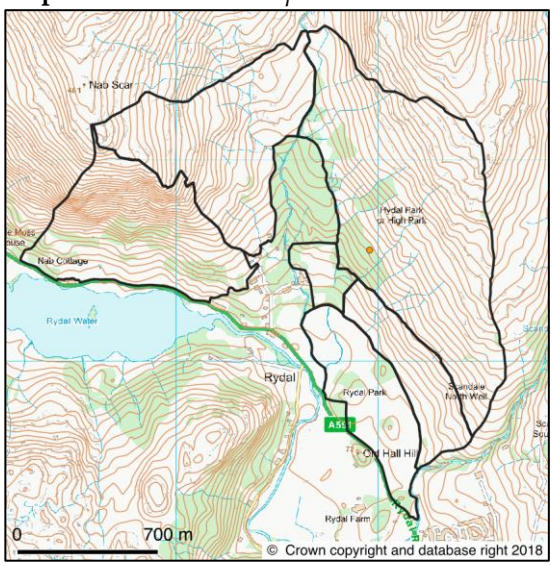

**Map 16** *Agonimia octospora*



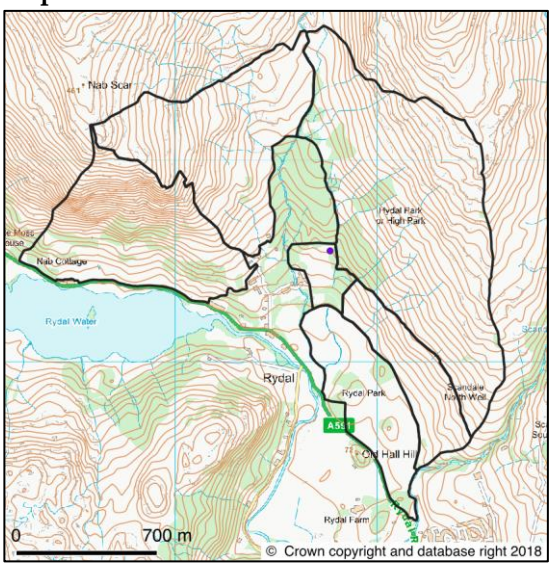

**Map 17** *Bacidia subincompta*



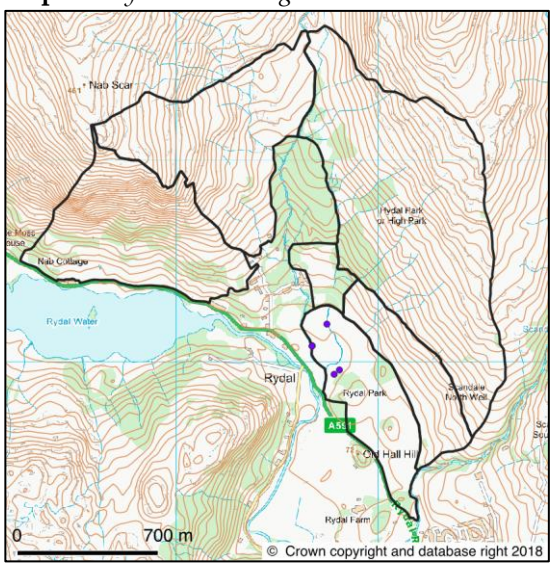

**Map 18** *Biatora vernalis*



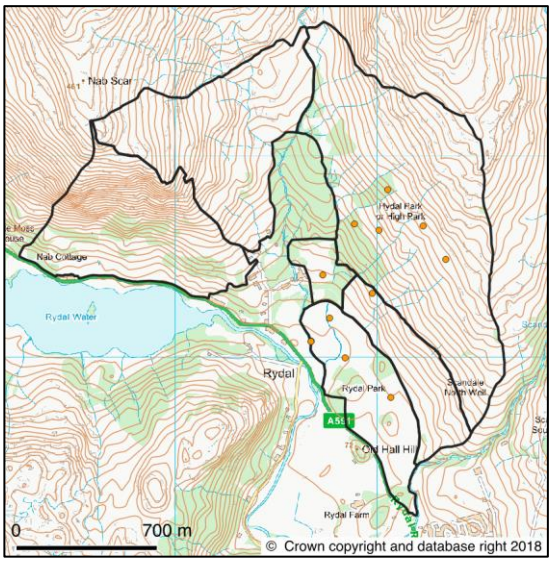

**Map 19** *Bryobilimbia sanguineoatra*



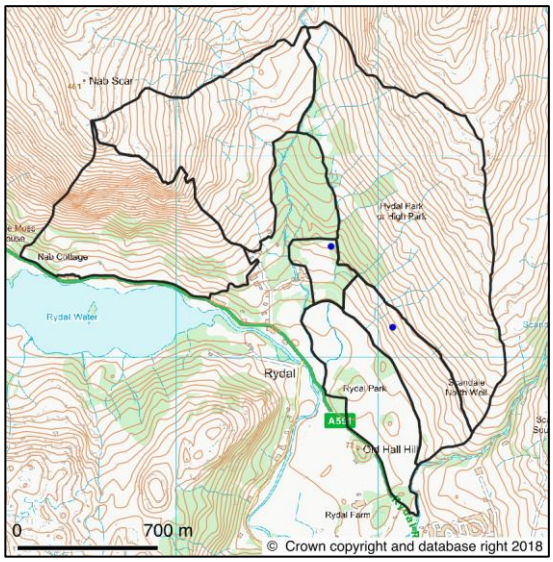

**Map 20** *Calicium lenticulare*



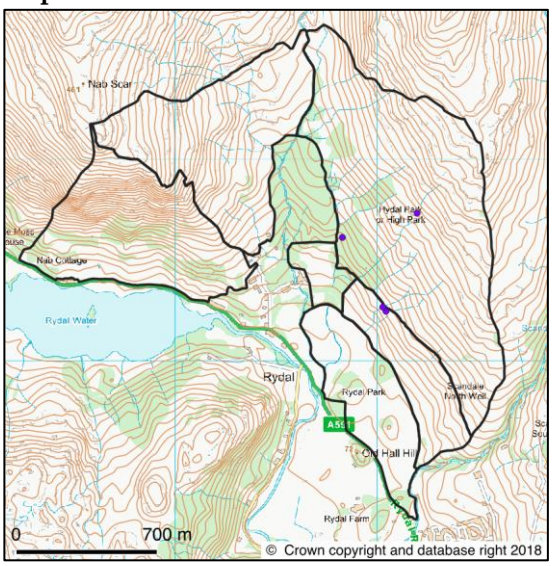

**Map 21** *Caloplaca herbidella* s. str.



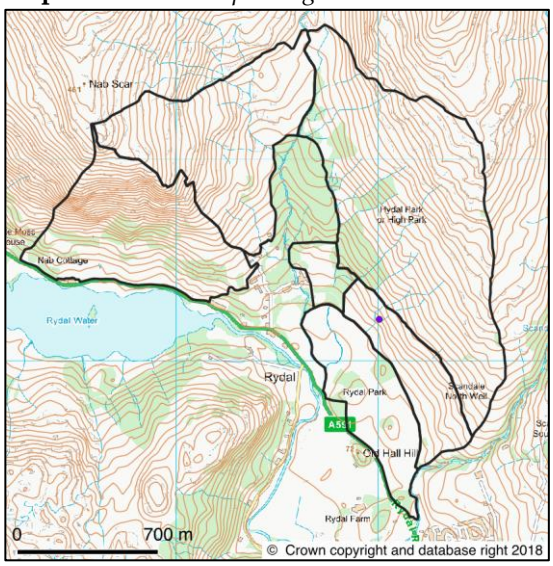

**Map 22** *Cetrelia cetrarioides*



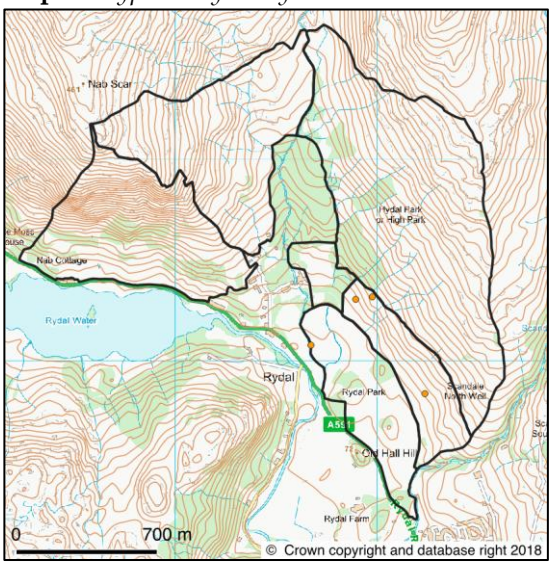

**Map 23** *Chaenothecopsis nigra*



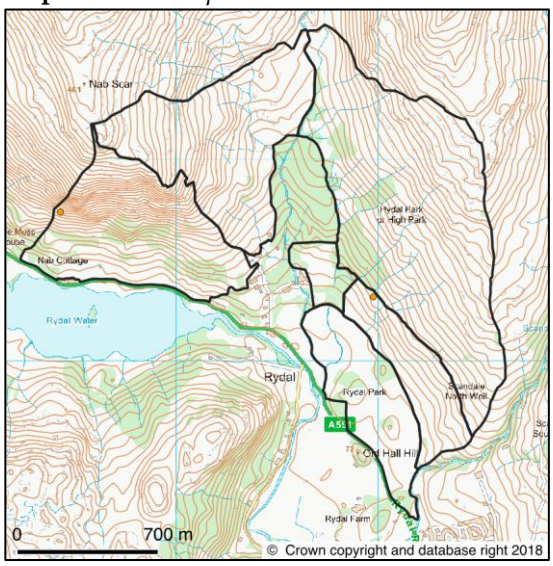

**Map 24** *Hypotrachyna taylorensis*



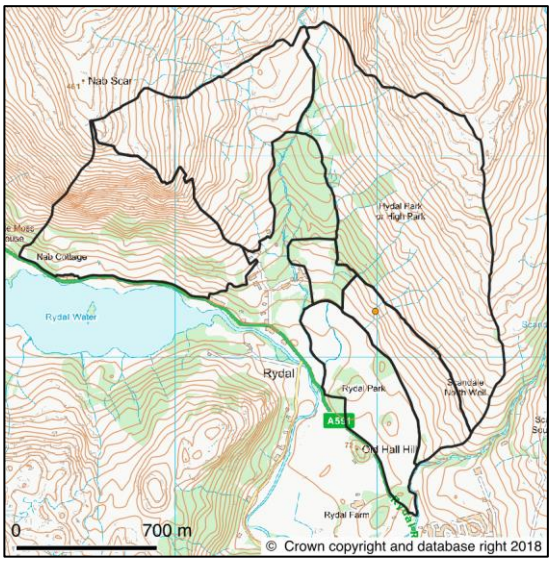

**Map 25** *Lecanora quercicola*



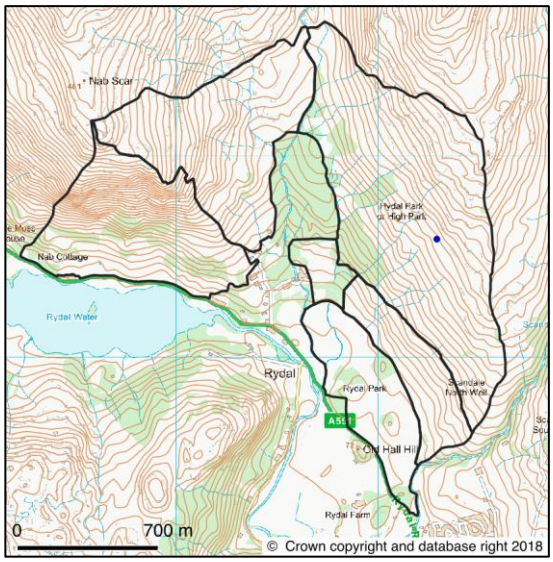

**Map 26** *Lobaria pulmonaria*



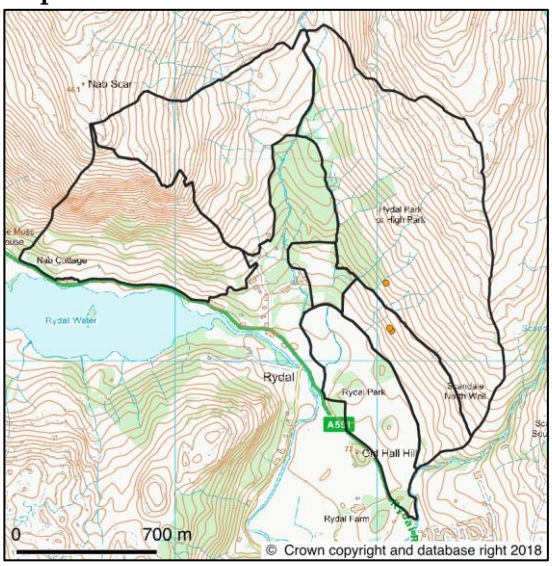

**Map 27** *Lobaria virens*



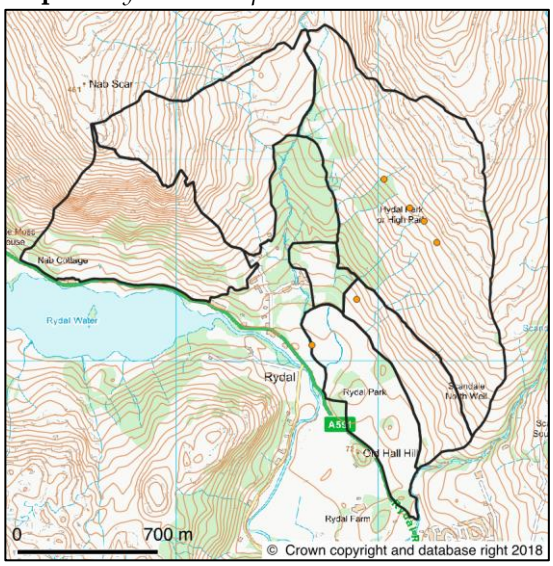

**Map 28** *Microcalicium ahlneri*



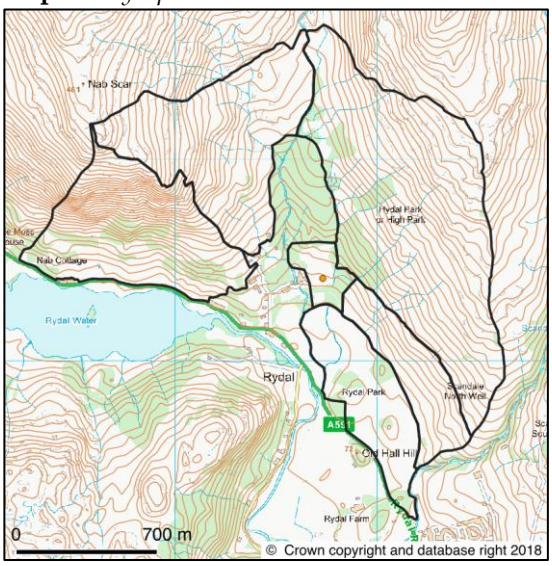

**Map 29** *Mycobilimbia pilularis*



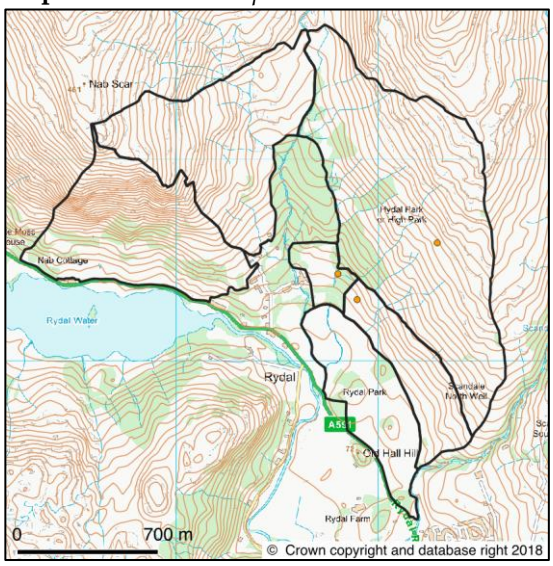

**Map 30** *Mycoporum lacteum*



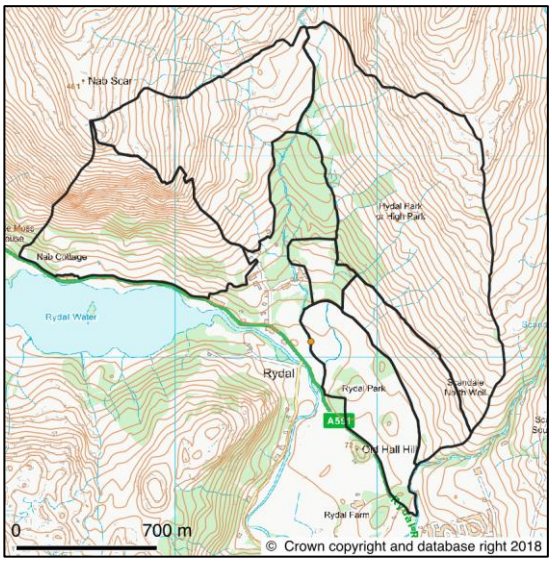

**Map 31** *Pannaria conoplea*



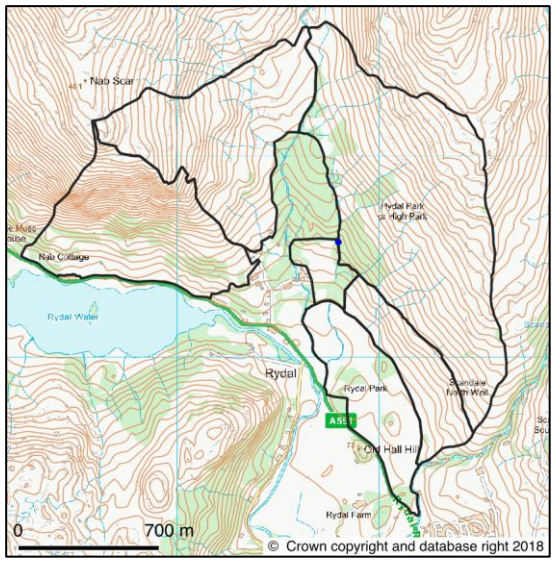

**Map 32** *Parmeliella parvula*



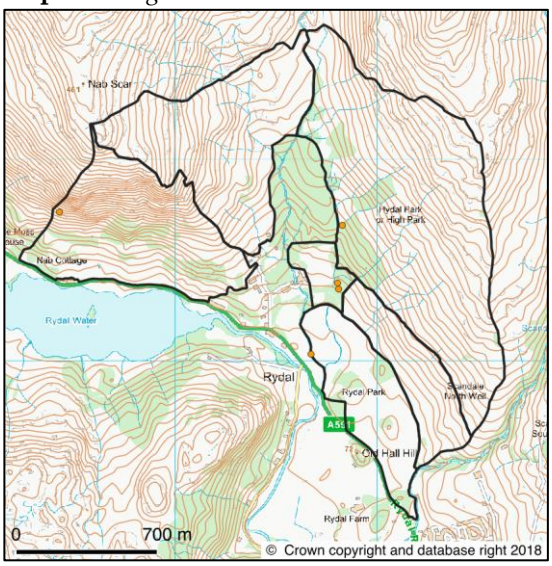

**Map 33** *Parmeliella triptophylla*



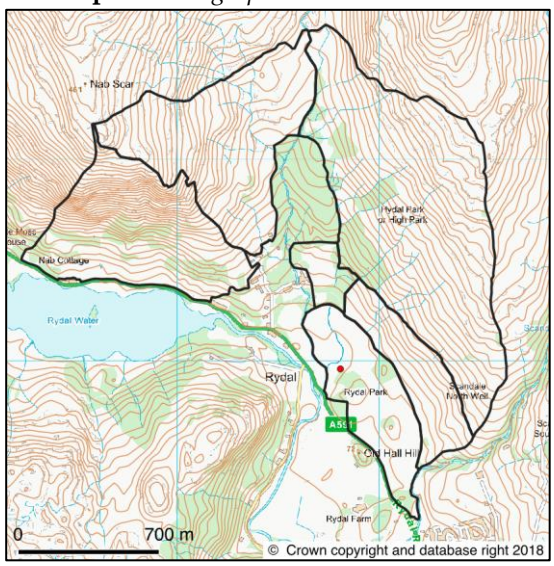

**Map 34** *Peltigera collina*



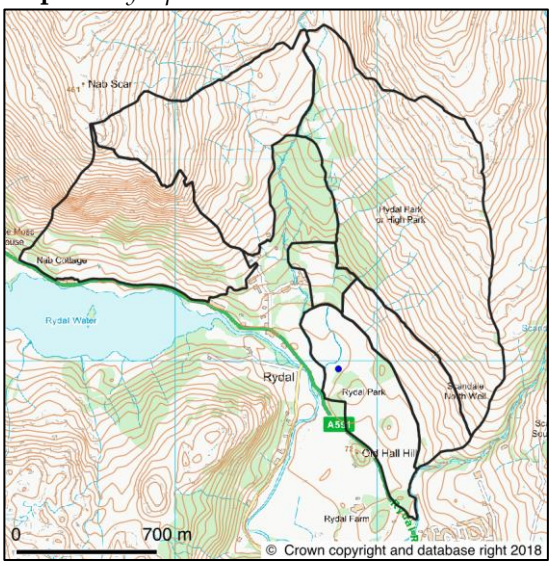

**Map 35** *Phaeographis inusta*



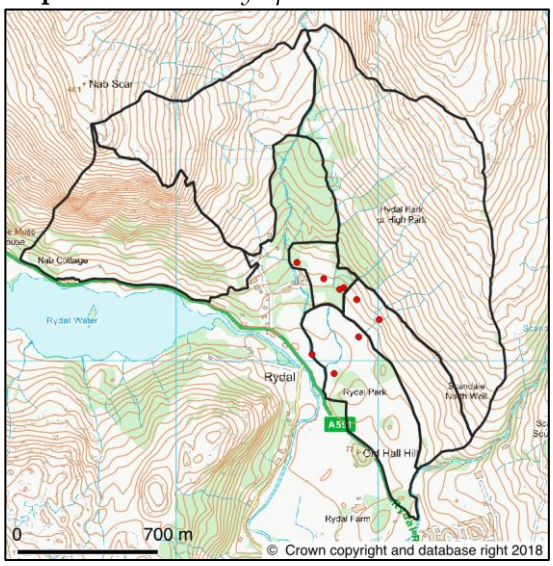

**Map 36** *Phyllopsora rosei*



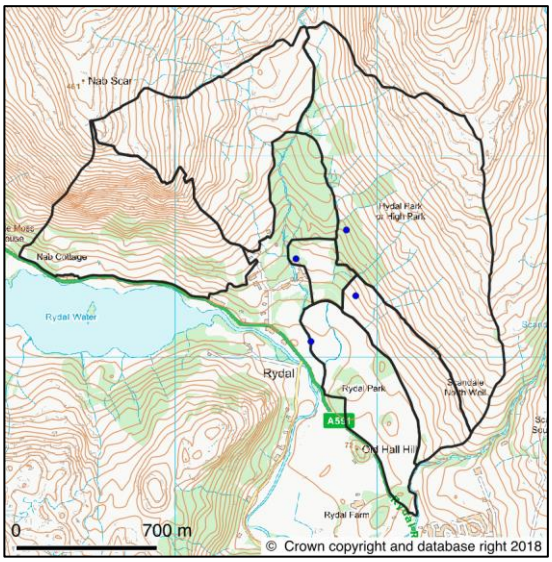

**Map 37** *Ramonia dictyospora*



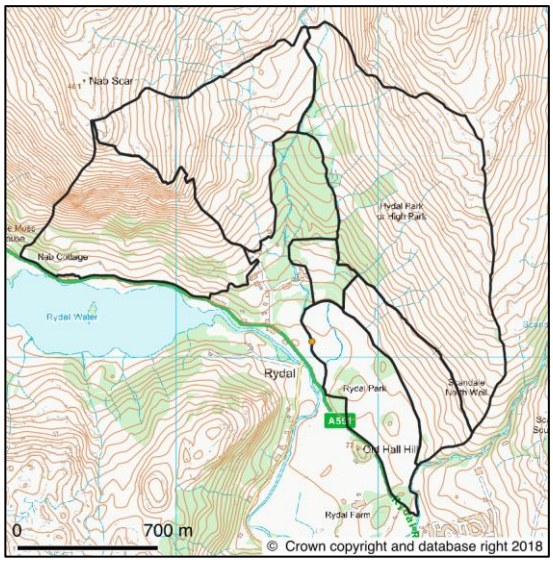

**Map 38** *Rinodina griseosoralifera*



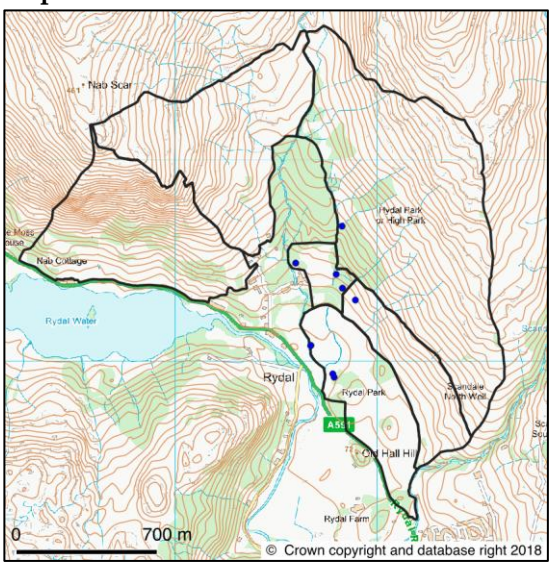

**Map 39** *Rinodina isidioides*




**Map 40** *Rinodina roboris* var. *roboris*



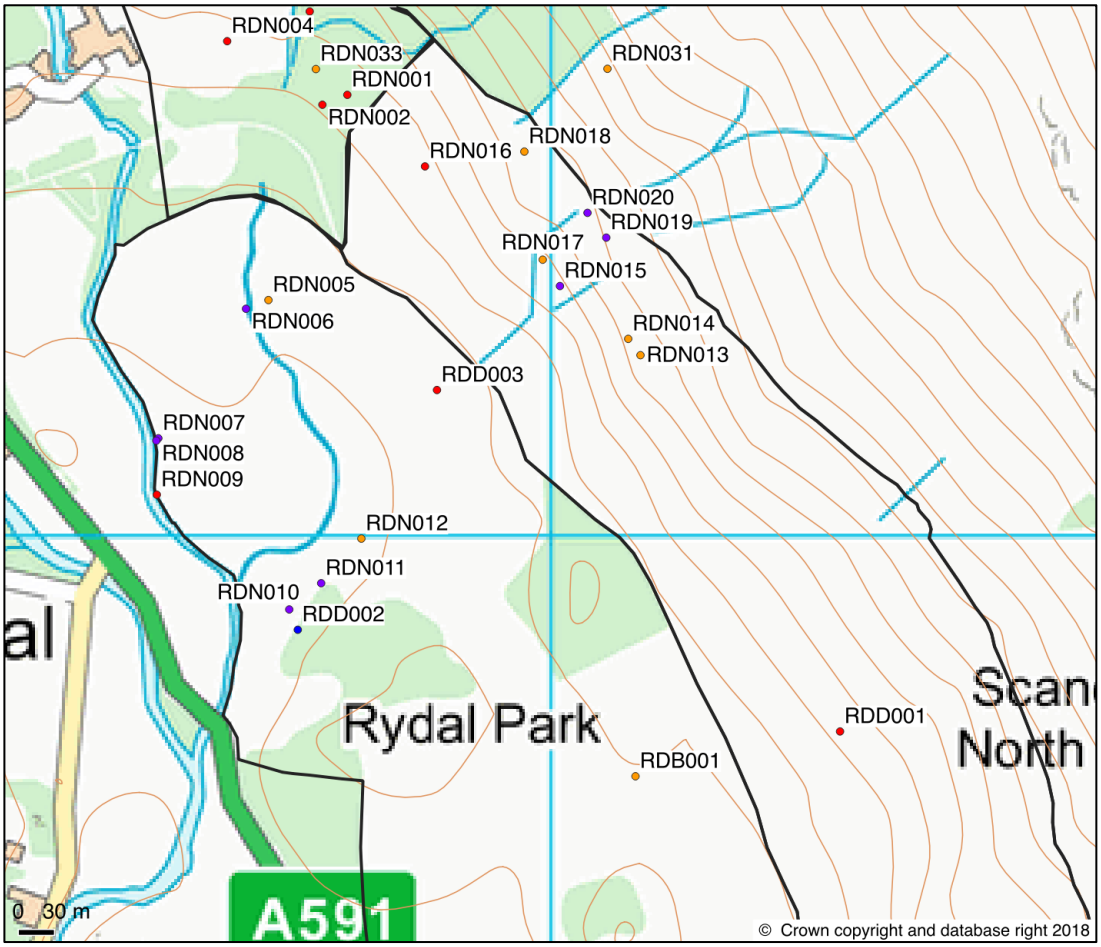

**Map 41** *Sticta limbata*



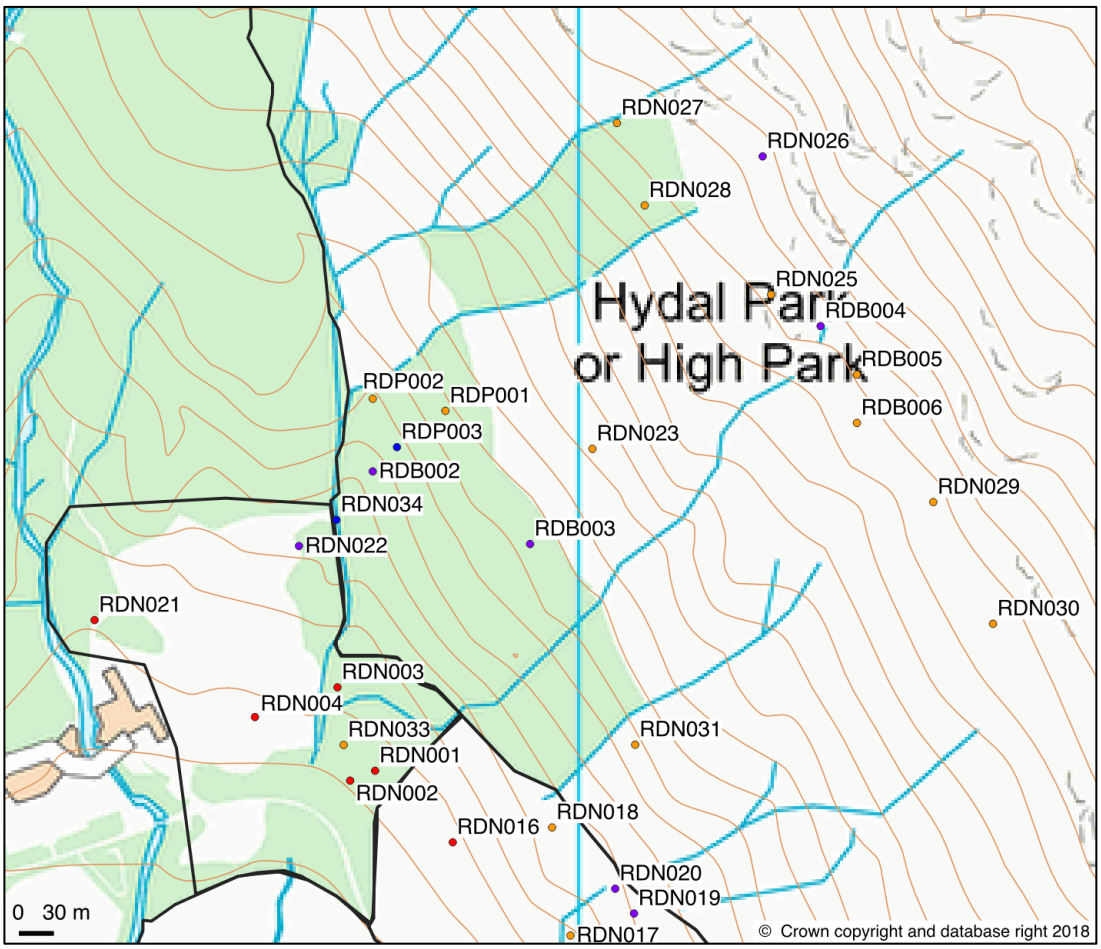

**Map 42** *Thelopsis rubella*

## B5 Waypoint Locations

**MAP 43**
**Rydal Park 2019 Waypoint Locations, South**

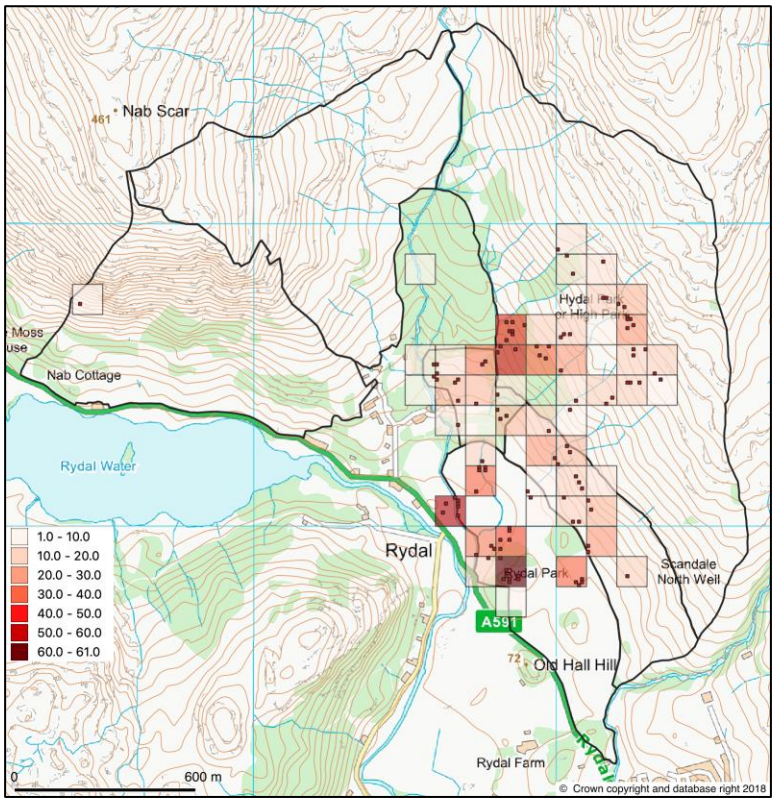


**MAP 44**
**Rydal Park 2019 Waypoint Locations, North**

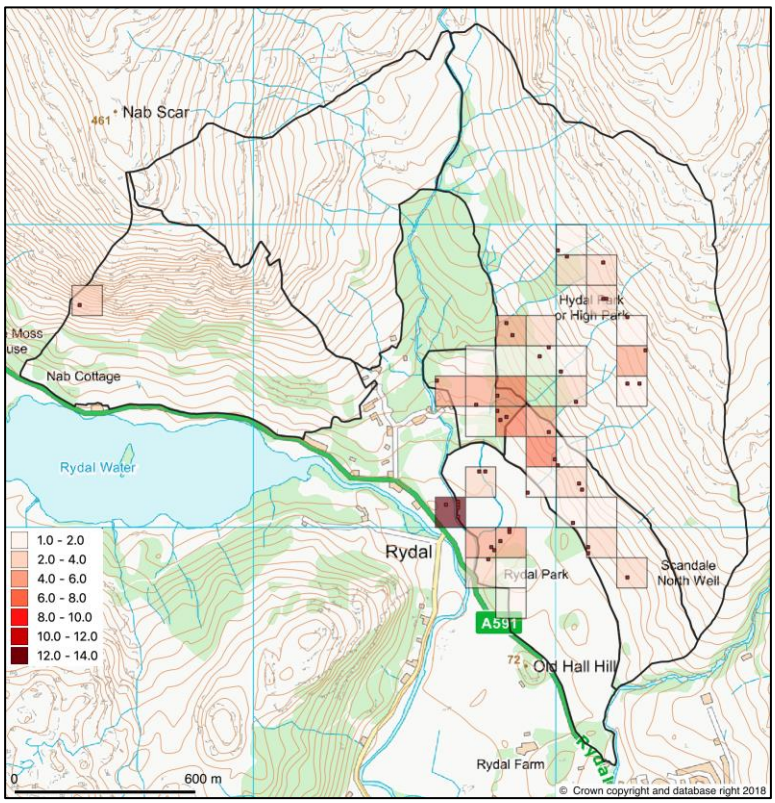


## B6 TomBio Maps

**MAP 45**
**Rydal Park 2019 Survey Diversity**



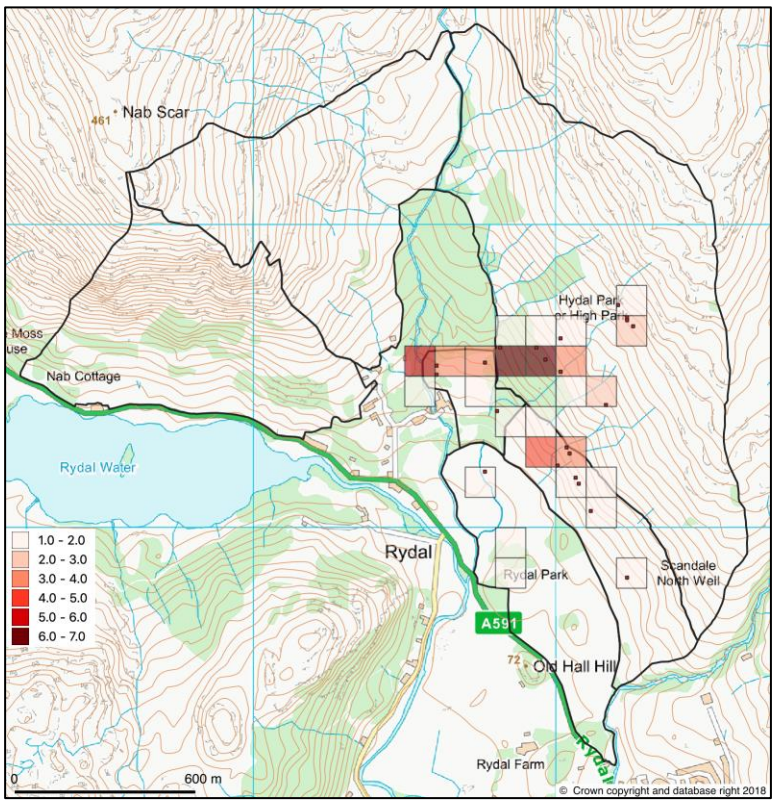
**MAP 46**
**Rydal Park 2019 Base Rich Bark Diversity**




**Species Used**
*Agonimia flabelliformis*
*Agonimia octospora*
*Bacidia biatorina*
*Bacidia rubella*
*Bacidia subincompta*
*Leptogium lichenoides*
*Leptogium subtile*
*Leptogium teretiusculum*
*Lobaria pulmonaria*
*Lobaria virens*
*Lopadium disciforme*
*Mycobilimbia epixanthoides*
*Mycobilimbia pilularis*
*Opegrapha cf multipuncta*
*Pachyphiale carneola*
*Pannaria conoplea*
*Parmeliella parvula*
*Parmeliella triptophylla*
*Peltigera collina*
*Peltigera horizontalis*
*Phyllopsora rosei*
*Ramonia dictyospora*
*Rinodina griseosoralifera*
*Rinodina isidioides*
*Rinodina roboris var. roboris*
*Sculula epiblastematica*
*Sticta limbata*
*Thelenella muscorum var. muscorum*

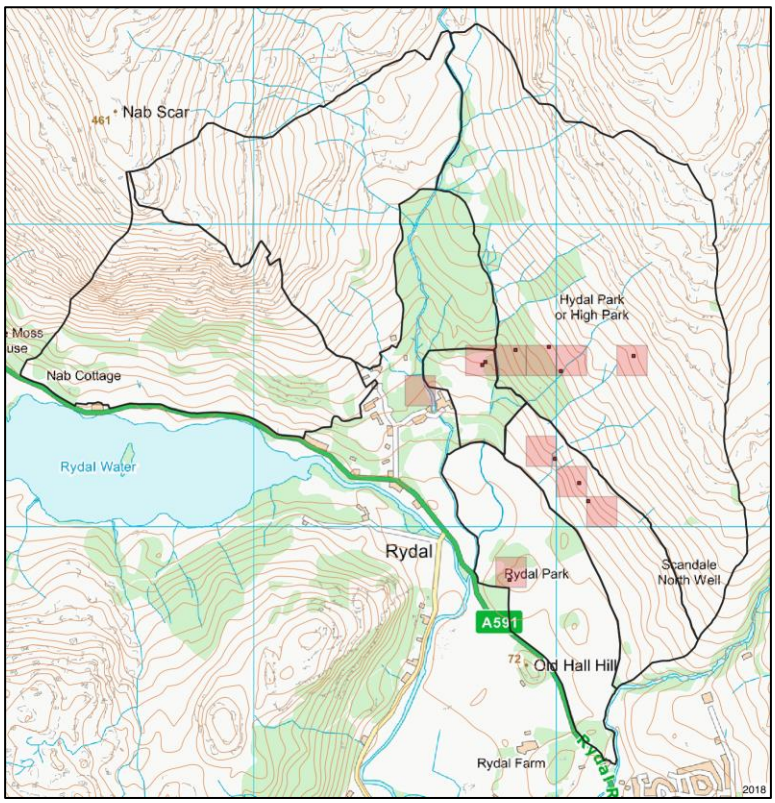
*Thelopsis rubella*

**MAP 47**
**Rydal Park 2019 Acid Bark Diversity**



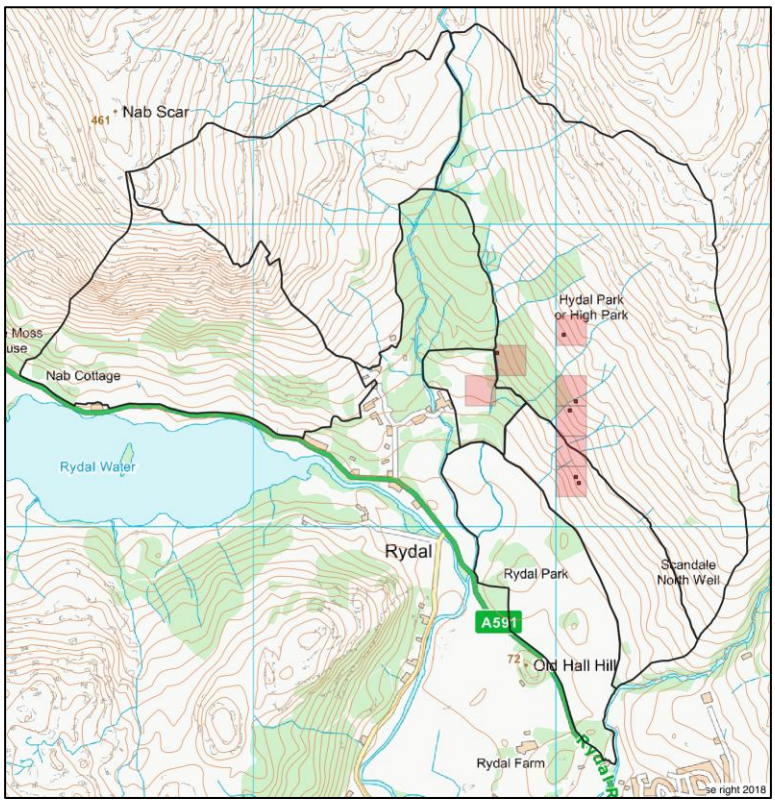

**Species Used**
*Anisomeridium ranunculosporum*
*Biatora vernalis*
*Bryobilimbia sanguineoatra*
*Calicium lenticulare*
*Cetrelia olivetorum s. lat.*
*Hypotrachyna laevigata*
*Hypotrachyna taylorensis*
*Lepraria membranacea*
*Loxospora elatina*
*Megalaria pulverea*
*Micarea doliiformis*
*Micarea stipitata*
*Micarea xanthonica*
*Mycoblastus caesius*
*Mycoblastus sanguinarius*
*Ropalospora viridis*
*Sphaerophorus globosus*
*Trapelia corticola*

**MAP 48**
**Rydal Park 2019 Lignum & Dry Bark Diversity**




**Species Used**
*Chaenotheca brunneola*
*Chaenotheca chrysocephala*
*Chaenotheca trichialis*
*Chaenothecopsis nigra*
*Cladonia parasitica*
*Imshaugia aleurites*
*Microcalicium ahlneri*

**MAP 49**
**Rydal Park 2019 Smooth Bark Diversity**




**Species Used**
*Eopyrenula avellanae*
*Mycoporum antecellens*
*Mycoporum lacteum*
*Phaeographis inusta*
*Stenocybe septata*
*Taeniolella toruloides*