

WOODLAND LICHENS

Hampshire Biodiversity Partnership

1 INTRODUCTION

As a group epiphytic woodland lichens (lichens growing on trees) figure significantly in systematic lists of rare and threatened species of lichens. Woodland species form 33% of the species listed as nationally threatened in the lichen Red Data Book¹ and 45% of county notable species in Hampshire². Also both nationally and locally, woodland has more threatened lichens than any other single habitat. These include several species listed in the national BAP including *Bacidia incompta*, *Enterographa elaborata* and *Enterographa soreliata*³, which occur in Hampshire.

The numerous rare and threatened lichen species of woodland occupy many niches but virtually all are associated with late succession features of woodland that are threatened by intensive woodland management⁴. Along with dead wood invertebrates, rich woodland lichen floras are particularly dependent on the maintenance of late succession features in woodlands. Internationally such late succession stands are called 'old growth'. In a British context these have been defined as stands with a stand age of 200 years or more⁵. Such old growth stands, and their associated lichen floras, are internationally threatened^{4,5,6,7,8} due to the intensification of forestry management and declines in traditional non-forestry based woodland management systems such as pasture woodland⁹. As such the conservation of old growth dependent lichen floras are an international responsibility. This will be partly covered by the national and local Wood Pasture Habitat Action Plans but old growth features such as veteran trees can be found in other types of woodland.

This plan covers the conservation of old growth dependent lichen species in Hampshire. This flora is large, with at least 128 species found to be old growth dependent in the New Forest¹⁰. In this SAP only species listed in the standard ancient woodland lichen indicator list the New Index of Ecological Continuity (NIEC)⁴ and any other BAP species are considered (Table 1).

2 CURRENT STATUS

2.1 Ecology and Habitat Requirements
Stand continuity: a fundamental feature of woodlands supporting rich lichen floras is stand continuity. The richest are those with near natural structures in which trees live natural life spans and have an abundance of veteran trees. A Study of clear felled stands of known ages (chronosequences) in the New Forest^{10,11} has produced important data on the effects of exploitation on stands. Maturing young growth stands between about 100 to 200 years old have variable levels of colonisation by the more mobile ancient woodland species. These can be abundant in such stands where close to old growth stands, but occur more rarely in abandoned coppices further away. In stands between 200 – 300 years old the bulk of the old growth dependant species can colonise from nearby older stands. Finally a small number of species require more than 300 years to colonise but are present on stands which have colonised farmland abandoned 600 years ago. These are mainly species of dry bark on old oak trees or specialised habitats on old beech trees. The former habitat develops only on very old oaks, while beech is a late regenerating species after clear felling.

Habitat Fragmentation: distance between old growth refuges is highly significant with gaps between woods of more than 2.5km severely reducing recolonisation by old growth dependant species¹⁰.

Light & Shelter: individual old growth dependant lichen species show high niche specialisation and variable tolerances of environmental conditions. In terms of woodland management and structure, however, the majority of species of value require both light and shelter from drying winds. These conditions are best developed in actively grazed pasture woodland with a variable structure, including glades and open canopied woodland with a thin shrub layer^{11,12}. Dense shrub layers in particular are injurious to lichen diversity and non-intervention with little grazing does not benefit lichen floras, even though veteran trees are conserved.

Tree Diversity: diversity of tree species and structural form enhances lichen diversity. Old oak is an important species throughout, with old beech holly and alder important in the New Forest area and old ash and maple

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also important elsewhere. Old hazel can also be significant if not coppiced. Exotic tree species are rarely of value in woodlands. Trees with complex architecture carry more diverse communities and damaged and twisted trees have more habitats than well grown timber trees.

Pollution: air pollution has had a serious effect on lichen diversity in parts of Hampshire. The main damage was caused by high levels of sulphur dioxide (SO₂) pollution (dry deposition) in the 1950s to 1970s. This kills most lichen species. This has since reduced but nitrogen pollution, especially ammonia from agriculture, can have a negative effect locally. The cleanest air is found in the south west of the county. Some very sensitive species, including BAP species, have been lost due to past pollution.

Implications. Ideal conditions for diverse lichen floras can be found in open structured pasture woodlands with a continuity of old trees stretching back in time to the wild wood in areas with clean air. These epiphytic lichen floras however, do have an ability to colonise, essential for their survival on a substrate with a limited, if long life span. The bulk of the old growth flora can colonise stands close to undisturbed old growth woodland within 200 – 300 years but the full restoration of the lichen flora probably takes between 300 – 600 years after clear felling. Conversely some species commonest in old growth stands do start colonisation before 200 years after felling and some species can be found at low levels in abandoned coppices and older young growth high forests. Relic veteran trees left during management can also support some species of interest in managed young growth woodland. This means that significant lichen floras can be found in 19th century oak plantations, old neglected coppices and relic trees from enclosed pasture woodlands. This long term ability to colonise new stands in areas with low habitat fragmentation closely reflects recent theories of the original wild wood as a dynamic and unstable system of expanding and contracting glades and groves¹³.

2.2 Distribution and Extent

International: Old growth stands are under extreme threat across the globe and the associated old growth epiphytic communities are especially vulnerable to damage by intensive silvicultural treatment or the neglect of grazing due to the high degree of habitat continuity required for their survival¹¹. Very few intact lichen rich old growth stands survive in the lowlands of Europe and the New Forest contains some of the richest stands in the lowlands of the North West

European temperate zone^{14,15}. Stands approaching of similar richness in Western Europe are restricted to the Forêt de Fontainebleau, Brittany and the Pyrenees¹⁴.

National: Sites of similar richness to the New Forest are mainly found in more oceanic areas to the west. A scatter of rich sites are found in Cornwall, Devon and Dorset which are close to the New Forest in their floristics. The New Forest epiphytic lichen flora of 350 taxa, which represents 20% of the lichen flora of the UK and Ireland, is of exceptional importance. A recent revision of lichen conservation status in Britain¹⁶ indicated that 104 of these species are of conservation concern including 54 RDB species, 39 national scarce species and 16 species International Responsibility species which are still not threatened in Britain. Many species have their world, national or regional head quarters in the New Forest.

Local: the known distribution of woods and parks rich in ancient woodland lichens is fairly complete for the richer sites but there are probably many more unknown sites of local interest. There is a massive concentration of important sites in the internationally important New Forest but woods with a high national or local lichen interest are scattered across the rest of the county.

No woods beyond the New Forest are of international importance but significant lichen floras are found in some sites. Several nationally significant New Forest specialists have outlying localities, including the RDB (Near Threatened) species *Micarea pycnidiphora* which is known from West Walk on the former Forest of Bere, Great Park, Weston Patrick and Waggoners Wells/Downlands in the Weald and *Agonimia octospora* at Kimeston Severals, on the downs.

Most of these sites have close links with former pasture woodlands but important species are found in stands that are adjacent to relict pasture woodland sites. Sometimes neglected coppices can harbour species of interest as well. There is a concentration of significant woods in and around the former Forest of Bere. There are also some important sites in the Weald. The latter including a very rich complex around Waggoners Wells, which includes relict pasture woodland, parkland and old growth beech high forest and the pasture woodland of Binswood. There are a few important sites on the Downs, especially Hurstbourne Park and Kimeston Severals.

Pollution effects are strong in the north of the county but the far west is cleaner and rich

sites such as Highclere Park are found here. There are some areas of interest to the north east, however, where sheltered conditions occur within larger woods.

2.3 Legislation & Site Designation

Three epiphytic woodland lichens, *Catillaria laureri*, *Enterographa elaborata* and *Parmelia minarum* are listed in schedule 8 of the Wildlife & Countryside Act; all are within the New Forest candidate SAC. In the New Forest area most of the internationally important sites are included within the New Forest candidate SAC but not all and at least one very important site is not a SSSI. Epiphytes are mentioned in one type of woodland listed in the New Forest Special Area for Conservation (SAC) (very acid Beech woods; covering about than half the Forest old growth woodlands) but lichen interest is related to woodland structural characteristics, not specific types of woodland. The epiphytic lichen flora is a key indicator of the ecological health of all the older woods included within the SAC.

Beyond the New Forest SSSI, some rich sites have been included within SSSIs, several with epiphytic lichens listed as supporting features and other woods with lichen floras of local value are also SSSIs. A total of 10 SSSIs, including the New Forest have woods rich in lichens. There has, however, been no systematic review of ancient woodland epiphytic lichens in terms of SSSI notification and several important sites have no statutory protection. In one of the most important sites, only part of the area of lichen interest is included within the SSSI. Most, but not all, significant sites not under statutory protection are within SINCs.

3 CURRENT FACTORS AFFECTING WOODLAND LICHENS

Factors affecting diverse lichen floras are complex, the neglect of formerly managed coppices and high forests is generally beneficial to epiphytic lichen floras but total non-intervention produces a poor lichen habitat in the long term. With free tree and shrub regeneration woods become too dense and relic pastures are impoverished by lack of grazing. Very rich and diverse lichen floras need conditions close to heavily grazed wild woodland and are very difficult to accommodate in conventionally managed woodland.

- Lack of traditional pasture woodland management. Changes in rural economies have led to the withdrawal of grazing from pasture woodlands. About half the lichen diversity has been recorded as being lost

when grazing is removed or reduce to an minimum¹⁰. The Forestry Commission's Woodland Grant Scheme, also precludes woodland grazing and this can frustrate pasture woodland restoration.

- Inappropriate non-intervention regimes; in the absence of significant grazing levels non-intervention will not benefit lichens or other light demanding old growth dependant species (the vast majority of such species). The concept of non-intervention as a conservation measure is challenged by lichenologists and others studying the biodiversity of old growth stands^{4,13,19,20}. The lower than expected biodiversity value of non-intervention stands is probably due to the absent of a fully functioning wildwood ecosystem with large herbivores⁹. More constructive methods of minimal intervention to conserve structurally diverse old growth woodland rather than non-intervention are likely to be more beneficial. These could include non-intensive timber exploitation combined with retention of many ancient trees in a manner that prevents deep shade developing around the old trees¹⁰.

- Lack of research in how to maintain old growth features in managed woodlands. From existing knowledge, simply leaving a thin scatter of trees unharvested within managed woodland is likely to be ineffectual as a biodiversity conservation measure. Advice on what will be worth doing is not easy to give.

- Pollution. Toxic sulphur pollution is declining but nitrogen pollution, from traffic and, in particular, agriculture has increased and is a threat to lichen diversity. The latter can cause the loss of woodland species adapted to low nutrient habitats and the effects can be seen well into woods in heavily cultivated regions.

- Incomplete knowledge of the resource. Surveying of lichens is patchy beyond the New Forest SAC and the results not yet published. Sites of interest could easily be lost through lack of knowledge.

4 CURRENT ACTION

4.1 Site and Species Protection

- See 2.3 for legislation and designation.
- SINC identification is ongoing in Hampshire and they are being incorporated into local plans. Woodland lichen diversity has been taken into account for a few sites but much data is still unavailable.

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- The British Lichen Society is reviewing the conservation status of lichen species and assessment of habitats. This will aid in the assessment the nature conservation value of sites.

4.2 Habitat Management and Programmes of Action

- The UK Forestry Strategy²¹ contains guidelines indicating that pasture woodland should be restored wherever possible. The Forestry Commission's own Woodland Grant Scheme, however, is in conflict with this and can be a major obstacle to woodland grazing.

- Within the New Forest SAC there is a major initiative promoting pasture woodland management within the European Union LIFE Nature Programme, which includes specific action for lichen conservation, such as holly cutting.

- English Nature is preparing a SAC management plan for the New Forest, which will include measures to maintain the pasture woodlands in favourable condition.

- Forest Enterprise is preparing Forest Design Plans for all its properties. In the New Forest major gains in the area of old growth woodland are proposed. Lichen interest in other properties may not have been fully accounted for, although that of West Walk, Forest of Bere, is the second richest outside of the New Forest Heritage Area.

- There are significant areas of old growth woodland owned by trusts where beneficial management, including restoration of grazing along with minimal intervention policies, have been reinstated (Roydon Woods and Binswood).

- The British Lichen Society is publishing a habitat management handbook, including a section on pasture woodland.

- Other management schemes and incentives relevant to woodland lichens are outlined in the Hampshire *Woodland Pasture and Parkland* Habitat Action Plan.

4.3 Action for Species

- National BAP plans for *Enterographa elaborata* and *Enterographa soledata* have not yet been started but surveying is planned. The BAP for *Bacidia incompta* is being written but will concentrate on its former hedgerow Elm habitat rather than its surviving woodland habitats.

- It is not considered that action for individual species, as opposed to protecting rich assemblages of woodland lichens, is practical. Studies of the two Schedule 8 species on the New Forest, *Catillaria laureri* and *Parmelia minarum*, recommended habitat management within lichen rich woods rather than specific work aimed at individual species²². The only exception may be the reintroduction of extinct species if this can be justified.

4.4 Survey, Research and Monitoring

- Extensive research and survey funded by EN, FE, HWT and the European Union LIFE Nature Programme in the New Forest is making major contributions to the understanding of the ecology and conservation of woodland lichens. This has contributed to a management handbook under preparation by the British Lichen Society. The project included setting up a database of lichen rich woodlands in the New Forest maintained by Botanical Survey & Assessment.

- Botanical Survey & Assessment maintains an unpublished and partially complete database of ancient woodland indicator lichens in Hampshire outside of the New Forest.

- Schedule 8 species are being regularly monitored using EN and HWT funding²³.

5 OBJECTIVES

The overall aim of this Plan is to protect and increase the distribution and populations of old growth dependant woodland lichens in Hampshire. This broad aim translates the specific objectives set out below. Where feasible, objectives have been allocated targets against which achievement can be measured. The 'Proposed Action' table in section 6 identifies the action to be taken to meet these objectives.

	OBJECTIVES	PROPOSED ACTIONS
A	Ensure no future loss of ancient woodlands lichens species from woodlands and related habitats.	1-10, 13-14
B	Achieve favourable management in pasture woodlands, relic pasture woodlands and other old growth stands or developing old growth stands.	1-11, 14
C	Improve knowledge of distribution, status and habitat requirements of ancient woodland lichens in Hampshire through appropriate research, survey and monitoring.	6, 12-14
D	Promote the importance of old growth stands and pasture woodlands in biodiversity conservation and the role of ancient woodland lichens in identifying such stands.	1-3, 6-10, 12-16

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6 PROPOSED ACTION

The following table lists the actions required to achieve the objectives set out in this Plan. Each action has been assigned to one or more 'Key Partners'. Key Partners are those organisations that are expected to take responsibility for the delivery of the actions assigned to them, according to the targets set in this Plan. Other organisations may also be involved in the delivery of action, and they have been indicated in the 'Others' column.

Key to symbols in Action Table:										
◆	To be completed by the indicated year. Work can commence at any time before the due date, at the discretion of the Key Partner.									
◆⇨	Design or production of a plan/strategy to be completed by this year and then followed by its implementation.									
➔	To start by the indicated year and usually followed by ongoing work. A start arrow in year 2004 can indicate a new action or a new impetus to existing work.									
⇨	Work that has already begun and is ongoing.									

	ACTION	DELIVERY BY		YEAR						MEETS OBJ.	
		Key Partner	Others	◆=complete by	◆⇨=design by and implement	➔=start by	⇨=ongoing	2004	2005		2006
Habitat Protection											
1	Review conservation status of lichen species and methods of assessing the importance of woodlands for lichens.	BLS	JNCC	⇨	⇨	⇨	⇨	⇨	⇨	⇨	A, B
2	Review statutory SSSI status of richest sites for ancient woodland lichens in as methods of assessing conservation status are developed. This may include condition assessment, none exist at present.	EN	BLS	⇨						◆	A, B, D
3	Review SINC selection of sites supporting ancient woodland lichens, ensuring criteria are appropriate, in light of existing and new data.	HBIC, LA's		⇨					◆		A, B, D
Habitat Management, Incentive Schemes & Other Resources											
4	Integrate the conservation and management of old growth woodland and pasture woodland into general policies for woodland conservation and management, including WGS, thereby allowing the implementation of the UK Forestry Strategy.	FC			➔						A, B, D
5	Encourage the inclusion of lichen rich pasture woodland in Countryside Stewardship as Historic Landscapes. Ensure appropriate advise is given on pasture woodland conservation.	DEFRA, FWAG	HWT HCC	⇨							A, B

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Habitat Management, Incentive Schemes & Other Resources										
6	Integrate a review of the management of sites with rich ancient lichen floras into the review of pasture woodland sites (Wood Pasture and Parkland HAP). This would cover non-pasture woodland sites where appropriate.	HCC	EN, HWT, FC, LAs	➔		◆				A, B, C, D
7	Identify and promote best practise for conserving old growth dependant species, including woodland lichens, in both pasture woodland and other woodlands	FC	BLS, ATF	◆➔						A, B, D
8	Complete and implement a New Forest SAC management plan.	LIFE III Partnership				◆➔				A, B, D
9	Complete Forest Design Plans for all state-owned woodland, taking into account woodland lichen conservation.	FC						◆		A, B, D
10	Ensure that non-intervention areas are not created to the detriment to old growth bio-diversity. Such areas should not normally be created in areas rich in ancient woodland lichens.	EN	FC, HWT			◆➔				A, B, D
Action for Species										
11	Review scope for reintroduction of very pollution sensitive species lost from the New Forest. Roydon Woods could be used as an experimental area	LIFE III partnership		◆➔				◆		B
Research, Survey and Monitoring										
12	Complete and publish database of all known sites rich in ancient woodland lichen in Hampshire, beyond the area covered by the New Forest Epiphytic Lichen Database.	BSA	HBIC, EN, HWT	➔				◆		C
13	Ensure that non-pasture woodland sites rich in ancient woodland lichens and other old growth sites are included within ASNW or pasture woodland inventories. It is important that old growth is recognised in the various inventories	HCC	HBIC, EN, HWT	◆➔						A, C, D
14	Undertake research into how to combine retention of old growth feature rich in biodiversity into managed woodlands	FC	EN, BLS	◆➔					◆	A, B, C, D
Communication, Awareness and Promotion										
15	BLS to publish and update Lichen Habitat Management Handbook.	BLS				◆➔				C, D

Communication, Awareness and Promotion										
16	Increase awareness in both land managers and those giving advise to land owners of the 'difficult' habitats requirements of ancient woodland lichens, i.e. requiring many old trees but disappearing from non-intervention stands. Encourage feed back on methods of positive management.	All		◆⇒						D

KEY TO ORGANISATIONS

- ATF Ancient Tree Forum
- BLS British Lichen Society
- BSA Botanical Survey & Assessment
- DEFRA Department for Environment, Food and Rural Affairs
- EN English Nature
- FC Forestry Commission
- FWAG Farming & Wildlife Advisory Service
- HBIC Hampshire Biodiversity Information Centre
- HCC Hampshire County Council
- HWT Hampshire Wildlife Trust
- JNCC Joint Nature Conservation Committee
- LAs Local Authorities

Woodland Lichens

Table 1 – Old growth dependant lichen species use in NIEC indicator list & other BAP species

Scientific name	Status/ Protection	Habitat/Ecology	Hants Distribution	Specific management requirements
<i>Agonimia allobata</i>	NS	Sheltered trees	Occasional New Forest, rare beyond	
<i>Agonimia octospora</i>	RDB NT, IR	Sheltered old woods	Frequent New Forest, very rare beyond	
<i>Arthonia astroidestra</i>	RDB NT, IR	Ancient Hollies	Occasional New Forest	
<i>Arthonia ilicina</i>	IR	Smooth bark on old trees	Abundant New Forest	
<i>Arthonia vinoso</i>		Rough base rich bark	Abundant New Forest occasional beyond	
<i>Arthopyrenia antecellans</i>		Smooth bark on old trees	Abundant New Forest	
<i>Arthopyrenia ranunculospora</i>		Old woods	Widespread in old woods	
<i>Bacidia biatorina</i>		Rough base rich bark	Abundant New Forest occasional beyond	
<i>Bacidia incopta</i>	RDB VU, BAP	Sap runs & hollow trees	Occasional New Forest , extinct beyond	
<i>Biatora epixanthoides</i>	NS	Base rich bark on old trees	Widespread New Forest	
<i>Biatora sphaeroides</i>		Ancient Hollies	Widespread New Forest	
<i>Buellia erubescens</i>	NT	Smooth bark on old trees	Occasional New Forest	
<i>Catillaria atropurpurea</i>		Base rich bark	Abundant New Forest occasional beyond	
<i>Cetrelia olivetorum</i>		Acid bark on old trees	Very rare in New Forest	
<i>Chaenotheca brunneola</i>		Lignum on standing trees	Abundant New Forest occasional beyond	
<i>Cladonia caespiticia</i>		Acid bark in humid stands	Frequent New Forest, occasional beyond	
<i>Cladonia parasitica</i>		Oak lignum	Common New Forest scattered beyond	
<i>Collema subflaccidum</i>		Base rich bark	New Forest, rare	
<i>Degelia plumbea</i>	IR	Base rich bark on old trees	Recently extinct in New Forest	Reintroduction?
<i>Dimerella lutea</i>		Base rich bark	Frequent New Forest	
<i>Enterographa elaborata</i>	RDB CE,BAP/Sch. 8	Ancient beeches	Single tree	Research
<i>Enterographa sorediata</i>	RDB NT, BAP	Ancient oaks	Occasional New Forest	
<i>Heterodermia obscurata</i>	RDB NT	Sheltered twigs	Recently extinct in New Forest	Reintroduction?
<i>Lecanactis amyloacea</i>	RDB VU, IR	Ancient oaks	Occasional New Forest	
<i>Lecanactis lyncea</i>	IR	Ancient oaks	Abundant New Forest rare beyond	
<i>Lecanactis premnea</i>	IR	Ancient oaks	Abundant New Forest occasional beyond	
<i>Lecanactis subabietina</i>	IR	Ancient oaks	Abundant New Forest occasional beyond	
<i>Lecanora jamesii</i>		Sheltered smooth bark	Frequent New Forest, very rare beyond	
<i>Lecanora quercicola</i>	RDB NT, IR	Well lit old oaks	Occasional New Forest rare beyond	
<i>Lecanora sublivescens</i>	RDB NT, IR	Well lit old oaks	Rare, New Forest & beyond	
<i>Leptogium lichenoides</i>		Base rich bark on old trees	Frequent New Forest	
<i>Leptogium teretiusculum</i>		Base rich bark on old trees	Occasional New Forest	
<i>Lobaria amplissima</i>	IR	Base rich bark on old trees	Very rare New Forest	
<i>Lobaria pulmonaria</i>	IR	Base rich bark on old trees	Occasional New Forest	
<i>Lobaria virens</i>	IR	Base rich bark on old trees	Occasional New Forest	
<i>Loxospora elatina</i>		Acid bark in old woods	Common New Forest, rare beyond	
<i>Megalospora tuberculosa</i>	RDB NT, IR	Base rich bark on old trees	Occasional New Forest	
<i>Micarea cinerea</i>		Acid bark in old woods	Very rare New Forest	
<i>Micarea pycnidiophora</i>	RDB NT, IR	Acid bark on old trees	Frequent New Forest, rare beyond	
<i>Nephroma laevigatum</i>	IR	Base rich bark on old trees	Recently extinct in New Forest	Reintroduction?
<i>Ochrolechia inversa</i>	NS	Acid bark on old trees	Frequent New Forest	
<i>Opegrapha corticola</i>	IR	Ancient oaks	Frequent New Forest, occasional beyond	
<i>Opegrapha prosodea</i>	RDB NT, IR	Ancient oaks	Rare	
<i>Pachyphiale carneola</i>		Base rich trees	Common New Forest, frequent beyond	
<i>Pannaria conoplea</i>	IR	Base rich bark on old trees	Rare New Forest	
<i>Parmelia crinita</i>		Rough bark on old trees	Frequent New Forest	
<i>Parmelia minarum</i>	RDB V/Sch. 8	Acid bark on old trees	Rare New Forest	
<i>Parmelia reddenda</i>		Rough bark on old trees	Frequent New Forest, scattered beyond	
<i>Peltigera horizontalis</i>		Base rich bark on old trees	Frequent New Forest, very rare beyond	
<i>Pertusaria multipuncta</i>		Smooth bark in old woods	Widespread & frequent	
<i>Pertusaria velata</i>	RDB VU, IR	Smooth bark on old trees	Frequent New Forest	
<i>Phaeographis dendritica</i>		Smooth bark in old woods	Common New Forest, occasional beyond	
<i>Phyllopsora rosei</i>	NS	Base rich bark on old trees	Frequent New Forest	
<i>Rinodina isidioides</i>	RDB VU, IR	Well lit base rich oaks	Occasional New Forest	
<i>Schismatomma niveum</i>	IR	Sheltered bark in woods	Frequent New Forest, occasional beyond	

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Schismatomma quercicola	NS, IR	Acid bark in old woods	Frequent in the south, rare beyond	
Stenocybe septata		Old Hollies	Common New Forest, occasional beyond	
Sticta limbata	IR	Base rich bark on old trees	Very rare & declining New Forest	Reintroduction?
Strangospora ochrophora		Base rich bark on old trees	Occasional New Forest, rare beyond	
Thelopsis rubella		Base rich bark on old trees	Frequent New Forest, rare beyond	
Thelotrema lepadinum		Sheltered old woodland	Abundant New Forest scattered beyond	
Usnea ceratina		Well lit trunks, old woods	Common New Forest, occasional beyond	
Usnea florida		Branches large trees	Widespread in south west	
Wadeana dendrographa	RDB NT, IR	Old Ash trees	Occasional New Forest	
Zamenhofia coralloidea	NS, IR	Base rich bark on old trees	Common New Forest, rare beyond	
Zamenhofia hibernica	RDB NT, IR	Base rich bark on old trees	Frequent New Forest	

KEY TO ABBREVIATIONS IN TABLE 1

Status IUCN categories

RDB CE Critically Endangered – species facing very high risk of extinction

RDB VU Vulnerable – species facing high risk of extinction

RDB NT Near Threatened – species likely to become vulnerable in future

Other Categories

NS Nationally Scarce – species not NT V and occurring in 100 or less 10km national grid squares

IR International Responsibility – species with strong populations in Britain but endangered beyond

BAP Biodiversity Action Plan Species

Sch. 8 Schedule 8 species

REFERENCES

- 1 **Red Bata Books of Britain and Ireland: Lichens Volume 1 Britain**, J. M. Church, B. J. Coppins, O. L. Gilbert, P. W. James & N. F. Stewart, JNCC, 1996.
- 2 **Rare and Scarce Plants in Hampshire**, N. A. Sanderson, Hampshire County Council (unpublished) 2000.
- 3 Unkown ref to national BAP Lichen species.
- 4 Temperate forest management: its effects on bryophytes and lichen floras and habitats, F. Rose. In: **Bryophytes and Lichens in a Changing Environment**, eds: J W Bates & A M Farmer, 211-233, Oxford University Press, 1992.
- 5 **Natural Woodland Ecology and Conservation in Northern Temperate Regions**, G. F. Peterken, Cambridge University Press, 1996.
- 6 Notes on old-growth dependant epiphytic macrolichens in inland British Columbia, T. Goward, **Act Botanica Fennica**, 150: 31-38, 1994.
- 7 Lichen diversity and stand continuity in the northern hardwoods and spruce-fir forests of northern New England and Western New Brunswick, S. B. Selva, **The Bryologist**, 97: 424-429, 1994.
- 8 Phytogeographical and ecological aspects of *Lobarion* communities in Europe, F. Rose, **Botanical Journal of the Linnean Society**, 69: 69-79, 1988
- 9 **Grazing Ecology and Forest History** F. W. M. Vera, CABI Publishing, Wallingford, 2000.
- 10 **Lichen Conservation within the New Forest Timber Inclosures**, N. A. Sanderson, Hampshire Wildlife Trust, 1996.
- 11 **New Forest Epiphytic Lichen Database Volume 4. Part 3 Summary of Results**, N. A. Sanderson, Hampshire Wildlife Trust, 1998.
- 12 **A Lichen Survey of South Bentley Inclosure**, N. A. Sanderson, Forestry Commission (unpublished), 1997.
- 13 **Grazing Ecology and Forest History**, F. W. M. Vera, CABI Publishing, Wallingford, 2000.
- 14 Regional studies on the British lichen flora I. The corticolous and ligniculous species of the New Forest, Hampshire, F. Rose & P. W. James, **Lichenologist**, 6: 1-72, 1974.
- 15 **The New Forest**, C. R. Tubbs, Collins, London, 1986.
- 16 **Conservation Evaluation of Lichens**, R. Woods, British Lichen Society, Consultation Draft, 2001
- 17 **New Forest SAC Plan**, R. Wright, English Nature, 2001
- 18 **Hampshire Epiphytic Lichen Database**, N. A. Sanderson, Botanical Survey & Assessment, Southampton (unpublished draft), 2000.
- 19 Grazing Lowland Pasture Woodlands C. Chatters & N. A. Sanderson, **British Wildlife**, 6: 78-88, 1994.
- 20 The role of grazing in the ecology of lowland pasture woodland with special reference to the New Forest, N. A. Sanderson, in: **Pollard and Veteran Tree Management II**, ed. H. J. Read, 111-118, Corporation of London, 1996.
- 21 **The UK Forestry Standard. The Governments Approach to Sustainable Forestry**, The Forestry Commission, Edinburgh, 1998
- 22 **An Ecological Survey of the Lichens *Catillaria laureri* and *Parmelia minarum* in the New Forest, Hampshire. Second Report**. N. A. Sanderson, Hampshire Wildlife Trust (unpublished), 1994.
- 23 **New Forest Rare Lichen Monitoring Project. (*Catillaria laureri*, *Parmelia minarum* and *Enterographa elaborata*)**. N. A. Sanderson, Hampshire Wildlife Trust (unpublished), 1999.

This is one of many Habitat, Species and Topic Action Plans being prepared by the Hampshire Biodiversity Partnership. It will be monitored by the Partnership and fully updated.

The Woodland Lichens SAP has been prepared by Neil Sanderson on behalf of the Hampshire Biodiversity Partnership.

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