

# HERICIUM TOOTH FUNGI

*Hericium erinaceum*, *H. coralloides*, *H. cirrhatum*

Hampshire Biodiversity Partnership

## 1 INTRODUCTION

The *Hericium* tooth fungi are rare species associated with old growth beech woodland and ancient wood pasture. Three species are known in the British Isles, and are characterised by a large fleshy fruit body covered with spore-bearing teeth or spines<sup>1</sup>.

*Hericium erinaceum* is identified as a priority species in the UK Biodiversity Action Plan, (UK BAP), and is listed under the Wildlife and Countryside Act 1981<sup>2</sup>. All three species are listed in both the UK and the European Provisional Red Data Lists<sup>3</sup>.

The species are found throughout continental Europe, but are not common. Within Britain, they are largely restricted to Southern England, in scattered populations. All three species are found in Hampshire, and particularly within the New Forest, which is clearly a national stronghold for *Hericium spp.* in the UK<sup>3</sup>. This justifies their inclusion in the Hampshire BAP.

## 2 CURRENT STATUS

### 2.1 Ecology and Habitat Requirements

The exact ecological requirements of *Hericium* tooth fungi vary according to species, although all members of the family are restricted to old deciduous woodland and wood pasture where there has been a long continuity of old trees.

The species appear to favour beech woodlands with base-enriched soils, as found over the Headon Beds and Barton Clays in the New Forest.

All species fruit from late August to December, or earlier in *H. cirrhatum*, and persist for up to six weeks. *H. erinaceum* and *H. coralloides* are known to fruit on the same tree annually for several years, while fruiting of *H. cirrhatum* is more sporadic.

*H. erinaceum* grows mainly in the wounds of old standing living trees, most commonly on Beech (*Fagus sylvatica*), but occasionally on Oak (*Quercus robur*). It is often found fruiting in a scar from a broken branch, producing a heart-rot following infection through the scar. It often fruits high up on trees, close to the trunk, (where branches are shed in high winds), but

can also be found on the sawn ends of felled trees, and on the trunks of fallen trees.

*H. coralloides* commonly fruits on logs lying on the ground, possibly favouring these over standing dead wood because of the higher moisture content. Most specimens are found on Beech, but some have been recorded on Ash (*Fraxinus*) and Elm (*Ulmus*). It rapidly decomposes the substrate, and is then thought to move, colonising nearby logs or dead trees.

*H. cirrhatum* is found on both standing trees and fallen branches and logs, most commonly on Beech, but sometimes on Ash, Elm and Oak, and possibly Birch (*Betula pendula*).

For more detailed information on individual species and colour photographs for accurate identification, readers are referred to Pegler *et al.* (1997)<sup>1</sup>.

### 2.2 Population and Distribution

It is difficult to determine the exact distribution of *Hericium* tooth fungi due to their inconspicuous nature; fruit bodies may not appear every year, particularly in *H. cirrhatum*, and specimens of *H. erinaceum* may be high off the ground and so difficult to locate.

The species are largely restricted to Southern and Eastern England, and have been recorded in sites across Hampshire, Berkshire, and West Sussex<sup>2</sup>. *H. cirrhatum* has also been recorded in Buckinghamshire, *H. coralloides* in Kent, and *H. erinaceum* in Wiltshire, Oxfordshire, Herefordshire, and Dorset.

Within Hampshire, records exist for all species from various locations within the New Forest, and a single specimen of *H. erinaceum* was found at Harewood Forest near Andover<sup>3</sup>.

### 2.3 Important Sites

In the New Forest, areas with old-growth broad-leaved pasture woodland (particularly Beech), and a continuity of both standing and fallen dead wood, are important for *Hericium* Tooth Fungi.

Twenty-nine sites within the New Forest Candidate Special Area of Conservation (cSAC) have been identified as having records of *Hericium spp.*, although not all of these are still thought to contain the species. *H. erinaceum* was present at 21 of the 29 sites,

*H. cirrhatum* at 18, and *H. coralloides* at only 6. The most significant of the sites thought to currently support *Hericium* include: Eyeworth Wood, Bramshaw Wood, Denny Wood, Denny Enclosure, and Rufus Stone, all of which have been known to support more than one species of *Hericium spp.* throughout time<sup>3</sup>.

### 2.4 Protection

*H. erinaceum* is protected under schedule 8 of the Wildlife and Countryside Act 1981, and is listed as a priority species under the UK BAP<sup>2</sup>. Despite being less frequent, throughout the New Forest at least, the other two species are not afforded the same protection<sup>3</sup>.

All three species are classified as vulnerable in both the provisional British Red Data List<sup>4</sup>, and the Provisional European Red Data List<sup>5</sup>, thus, site management and species protection is required to ensure the continuity of the species.

Many of the *Hericium* sites are protected within designated areas such as SSSIs or nature reserves, and are associated with old growth Beech Woodland, which is itself a BAP Priority Habitat.

The overall objective of the UK Biodiversity Action Plan for *H. erinaceum* is to maintain viable populations of the species at all extant sites, and to increase their extent at these sites where possible<sup>2</sup>. This would seem an appropriate objective to recommend for all three species. In the New Forest the sites lie within the New Forest cSAC, and so the SAC Management Plan is the appropriate mechanism for achieving this objective within Hampshire<sup>7</sup>.

## 3 CURRENT FACTORS AFFECTING HERICIUM TOOTH FUNGI

- Continuity of mature woodland is essential for the survival of *Hericium* Tooth Fungi. The threat of inappropriate management of woodlands, such as the removal of dead wood, or the loss of broadleaved woodlands to commercial forestry are the main factors affecting these species<sup>3</sup>.
- Observations of very low densities of *Hericium* species in comparison to the amount of apparently suitable habitat may indicate that they require large areas in which to survive, highlighting the importance of linking areas of suitable habitat<sup>3</sup>.
- Observation of the species also suggests that other species of fungi are rarely found on the same log as *Hericium* species, which may indicate that they are poor competitors.

(Alternatively, they may be capable of suppressing competitors. There is scope for laboratory research into this matter – see current action)<sup>3</sup>.

- Variations in fruiting are thought to be related to changing environmental conditions. As a result of environmental changes, such as global warming, these conditions may not be met, which could have a negative effect on species status in the long term. Research is needed to determine the requirements of the fungi and their response to environmental change – see current action<sup>3</sup>.
- All of the species are edible when young, and so may be threatened by collection for culinary purposes. (*H. erinaceum* is sold in Supermarkets as 'Lion's Mane', but it is likely that it has been cultivated as opposed to collected)<sup>1</sup>. Collection for botanical purposes may also be a threat<sup>2</sup>.

## 4 CURRENT ACTION

### 4.1 National

- The UK Biodiversity Action Plan Fungi Working Group are co-ordinating on-going work on the conservation and research of *Hericium* species.
- A PhD project is currently underway at Cardiff University to investigate the ecological requirements of *Hericium spp.* spore dispersal and competitive abilities.

### 4.2 Local

- In 1998 the Hampshire Wildlife Trust, with volunteers from the Hampshire Fungus Group and others, undertook a survey of sites within the New Forest for *Hericium* tooth fungi. The report collated all available data to determine the distribution and status of these species within the New Forest and highlighted the need for future monitoring<sup>3</sup>.
- The report was distributed to various interested parties such as other Wildlife Trusts, and organisations with connections to the New Forest. The aim of this was to increase awareness of the existence and requirements of *Hericium* tooth fungi, and to encourage appropriate management practices, future monitoring, and research<sup>3</sup>.
- A full survey of the New Forest is due to be repeated in 2003.

## 5 OBJECTIVES

The overall aim of this Plan is to protect and increase the distribution and population of stipitate hydroid fungi 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
<b>A</b>	Maintain existing populations of <i>Hericiium spp.</i> by preventing loss and damage to sites significant for these species.	<b>1-5, 7</b>
<b>B</b>	Enhance the status of <i>Hericiium spp.</i> in Hampshire by creation and suitable management of broad-leaved woodland.	<b>4-7</b>
<b>C</b>	Establish and maintain a comprehensive understanding of <i>Hericiium spp.</i> distribution, status and ecological requirements in the New Forest and other sites in Hampshire through appropriate research, survey and monitoring.	<b>8-13</b>
<b>D</b>	Promote communication, education and awareness of the status and needs of <i>Hericiium spp.</i> particularly amongst land owners and managers.	<b>14-15</b>

**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 2003 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	2003	2004	2005	2006	2010	2015	
◆ = complete by    ➡ = start by ⇨ = ongoing    ◆⇨ = design by and implement										
<b>Site and Species Policy and Protection</b>										
1	Where populations of <i>Hericium spp.</i> are identified outside of designated conservation areas, consider designation of SSSIs, SINCs, etc in line with current criteria.	EN	LAs, HCC	➡		◆				A
2	Review the effectiveness of existing site protection measures in preventing deterioration and loss of stipitate hydroid fungi habitats.	EN	FE, HWT	➡		◆				A
3	Ensure that the management plans for the New Forest Candidate Special Area of Conservation (NF cSAC) are adhered to, and that the management of the pasture woodlands within the New Forest is compatible with the habitat requirements of the species.	FE	EN	⇨	⇨	⇨	⇨	⇨	⇨	A
4	Ensure that the Forest Design Plan for the New Forest continues to take account of the needs of <i>Hericium spp.</i> By maintaining and increasing the amount of suitable habitat.	FE	EN	⇨	⇨	⇨	⇨	⇨	⇨	A, B

## Hericium Tooth Fungi

<b>Site and Species Management</b>										
5	Ensure favourable management of sites with records of <i>Hericium spp.</i> to maintain the current distribution and status of the species. For example continuity of dead wood at all stages of decay within mature Beech woodland.	FE		↔	↔	↔	↔	↔	↔	A, B
6	Endeavour to increase the distribution of <i>Hericium spp.</i> by appropriate management of sites adjacent to existing populations.	FE		↔	↔	↔	↔	↔	↔	B
7	Use information provided by PhD study to inform management process.	CU, FE	BMS, PL, EN	↔	◆					A, B
<b>Research, Survey and Monitoring</b>										
8	Monitor all extant populations every year i.e. all trees with known fruit bodies. Visit during the fruiting season to check on populations and record habitat changes.	HWT	HFG, FE, EN, PL	↔	↔	↔	↔	↔	↔	C
9	Record other fungi species on the same tree/substrate to help build up a picture of tolerance to competition, backed up by laboratory experiments.	FCF	BMS, PL, EN	↔	◆					C
10	Where <i>H. erinaceum</i> is recorded on fallen trees, monitor to see how long it lasts before other species come in (e.g. <i>H. coralloides</i> ) if they indeed do.	FCF	BMS, PL, EN	↔	◆					C
11	<i>H. coralloides</i> has been observed only fruiting for 2 to 4 years on the same log before it totally decomposes; monitor to determine if it colonises logs close by after original substrate has disappeared.	FCF	BMS, PL, EN	↔	◆					C
12	Survey all known and potential sites in the New Forest for <i>Hericium spp.</i> to determine the exact distribution and status of these species.	HWT	FE, HFG	◆↔	◆					C
13	Research to investigate which environmental conditions favour mycelial spread and which favour fruiting.	FCF	BMS, PL, EN	↔	◆					C
<b>Communication, Awareness and Promotion</b>										
14	Create an easy to read document to ensure that land owners are aware of extant populations and the importance of <i>Hericium spp.</i> in management proposals.	HWT	FE	◆↔	◆					D
15	Provide data to county and national databases to ensure up-to-date red lists of stipitate hydroid fungi.	HWT, HBIC, JNCC		↔	↔	↔	↔	↔	↔	D

**KEY TO ORGANISATIONS:**

BMS British Mycological Society  
EN English Nature  
FE Forest Enterprise  
HBIC Hampshire Biodiversity Information Centre  
HCC Hampshire County Council  
HFG Hampshire Fungus Group

HWT Hampshire Wildlife Trust  
JNCC Joint Nature Conservancy Council  
LAs Local Authorities  
PL Plant Life  
FCF Fungus conservation Forum

**REFERENCES**

1. Pegler, D. N., Roberts, P.J., and Spooner, B. M. (1997) *British Chanterrelles and Tooth Fungi*. Royal Botanic Gardens, Kew.
2. UK Biodiversity Group. (1999). *Tranche 2 Action Plans – Volume 3: Plants and Fungi.*, English Nature.
3. Wicks, D. (Ed.) (1999) *Survey of the New Forest for the Tooth Fungi *Hericium erinaceum* and *Hericium coralloides**. Hampshire and Isle of Wight Wildlife Trust.
4. Ing, B. (1992a) *A provisional Red Data List of British Fungi*. *Mycologist* 6 (3) 124-128.
5. Ing, B. (1992b) *Towards a Red Data List of Endangered European Macrofungi*. In: Pegler, D. N., Boddy, D., Ing, B., and Kirk. Royal Botanic Gardens, Kew
6. *Towards a Red List of Endangered European Macrofungi, *Fungi of Europe**, B Ing, D Pegler, D Boddy, Kirk, Royal Botanic Gardens, Kew, 1993.
7. Westerhoff, D. and Wright R. (2001) *The New Forest (SAC) Management Plan*. English Nature.

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 reviewed.

This species action plan has been prepared by the Hampshire Wildlife Trust on behalf of the Hampshire Biodiversity Partnership.

For further information contact: Naomi Ewald, Hampshire Wildlife Trust, Woodside House, Woodside Road, Eastleigh, Hampshire SO50 4ET, e-mail: NaomiE@hwt.org.uk