Report on the oak polypore *Piptoporus quercinus* (syn. *Buglossoporus quercinus*; *B. pulvinus*)

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Report on the oak polypore *Piptoporus quercinus* (syn. *Buglossoporus quercinus; B. pulvinus; B. pulvinus*) A UK BAP priority species and Schedule 8 species

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Contents

Summary

The oak polypore *Piptoporus quercinus* is a fungal species which lives preferentially (perhaps exclusively) on old oak heartwood. It is widespread with oaks throughout Europe and across Asia, but is nowhere considered to be common. It is on Red Data Lists as 'extinct' or 'threatened with extinction' in Great Britain, Germany, Norway, and Poland (Lizon 1995). It is considered threatened in England firstly because there are comparatively few records and secondly because its habitat may be restricted.

The oak polypore is specially protected under Schedule 8 of the Wildlife and Countryside Act, 1981. This means it is an offence to intentionally pick, uproot or destroy the fungus. A Biodiversity Action Plan has been drawn up for the species to ensure that British populations are protected and maintained by ensuring a continuation of mature oaks in the vicinity of existing colonies. This may include the protection of regenerating oak saplings and the establishment of new oak pollards.

The oak polypore has been recorded or reported from 29 sites in 19 English counties, but only 18 of these records and reports are from the last 30 years. It is undoubtedly under-recorded because of its unusually early (July-August) fruiting period.

It must be stressed that at present we know extremely little about this fungus. Gathering basic distribution and habitat data and undertaking basic ecological and biological research is absolutely essential.

As a priority, it is strongly recommended that local naturalists and field mycologists should be encouraged to look for fruitbodies of the fungus on old oaks and their remains in their local parks, hedgerows, and woodlands in July-August. Within a few years (it does not fruit every year) this may give us a better idea of the true distribution of the oak polypore in Britain and hence whether the fungus is merely uncommon or genuinely rare.

It is also recommended that research be undertaken into the ecology and biology of the oak polypore, in particular whether it is restricted to old oaks (as fruitbody appearance suggests), what form of dispersal it has evolved, and what its interactions are with other heart-rotting fungi on the same limb or trunk. This will lead to better and more informed advice on appropriate management.

Description

Fruitbodies of the oak polypore typically appear in July or August and last for a few weeks only (though remains of decayed fruitbodies may be found at any time of year). They are produced singly or in small clusters on the limbs and trunks of dead or living oak trees or on fallen heartwood. According to Pilát (1936), the species forms abnormal growths (f. *monstrosa*) on oak in mines and caves.

Field characters. Fruitbodies are bracket-like, with a smooth upper surface, slightly velvety to touch when young, and (when mature) with pores on the underside. Fruitbodies can grow up to 19 cm across, narrowing at the point of attachment, and up to 5 cm thick. They are fleshy (not hard) when fresh, whitish at first on the upper surface becoming pale yellow, darkening to brown, with a white margin. Maturing fruitbodies often bruise vinaceous, turning slowly brown. The pores are circular, small (about 2 – 4 per mm), white at first gradually turning brownish. Actively expanding fruitbodies may exude hyaline or yellow-brown liquid, particularly from the developing tube layer. (Colour photographs in Green 2000; Ryman & Holmåsen 1984; Vesterholt & Knudsen 1990; Wöldecke 1998.)

Microscopic characters. Hyphae in the fruitbody context are mainly skeletal (thick-walled and without septa), 3 – 6 (- 8) μm wide, hyaline to pale brown, intermixed with thin-walled generative hyphae, 3 – 6 μm wide, with clamp-connexions. Hyphae in the hymenium (tubes and pores) are entirely generative. Basidia are 4-sterigmate, 25 – 30 μm long. Basidiospores are fusiform, 6 – 8 x 2.5 – 3.5 μm, hyaline. (Drawings in Ryvarden & Gilbertson 1994.)

Cultural characters. A description of the oak polypore mycelium in culture was provided by Stalpers (1978). Of note is the production of numerous asexual, subglobose to ellipsoid, thick-walled chlamydospores. These may function as 'resting spores' or propagules, allowing the fungus to persist when conditions are unsuitable for growth or maintenance of mycelium. Similar chlamydospores have also been found in an old fruitbody (Martyn Ainsworth, pers. comm.).

Other species. The only other species of *Piptoporus* in England is the 'razor-strop fungus' *Piptoporus betulinus*. This occurs almost exclusively on birch *Betula*, causing a brown rot of the sapwood. It is extremely common and widespread, producing conspicuous annual fruitbodies in the autumn.

Many other large polypores on oak *Quercus*, such as the dark brown, hard, perennial *Phellinus robustus* or the slot-pored *Daedalea quercina*, should be sufficiently distinct from *Piptoporus quercinus* not to cause any confusion. The following species, however, could be confused in the field (microscopic distinctions are given in Table 1).

***Fistulina hepatica* ('beefsteak fungus').** This is a heartwood-rotting species, virtually restricted to oak and chestnut *Castanea*, but very common and widespread. Fruitbodies often occur high up in old trees and are then virtually impossible to distinguish by sight from *Piptoporus quercinus*, both species appearing similar from below. Close up, the dark red (beefsteak) colour of the upper surface of *Fistulina hepatica* is distinctive. It is distinguished microscopically by its monomitic hyphal system and substantially smaller basidiospores.

Ganoderma resinaceum. This is a rather uncommon heartwood-rotting species, normally found on oak. When mature, it is woody-hard, brown, and not likely to be confused with the oak polypore. But immature specimens are softer and have a yellowish colour very similar to that of the oak polypore. In this state, the present writer and several other correspondents have mistaken the species for oak polypore in the field. Under a lens, however, it can be seen that the yellow colour is present as a resinous surface layer. The species is also much tougher when cut, has a brownish context, and is easily distinguished microscopically by its large, brown spores.

Inonotus dryadeus **('weeping oak polypore')**. This is also a rather uncommon heartwood-rotting species, normally found on oak. It is of similar size to the oak polypore, but typically has a buff pore surface, brown context, and frequently exudes brownish droplets in damp weather. Microscopically it is distinguished by its brown, unclamped hyphae and the presence of brown, thick-walled, thorn-like 'setae' in the hymenium.

Laetiporus sulphureus **('chicken of the woods').** This is common and widespread on a range of deciduous trees and also on yew *Taxus*, causing a heartwood rot. Fruitbodies appear in summer, at the same time as *Piptoporus quercinus*, and can appear very similar, especially when young or when very old. It is distinguished by its unclamped hyphae and more squat basidiospores.

Table 1: Comparison of microscopic characters of polypores on oak which could be confused in the field. Spore measurements taken from Ryvarden & Gilbertson (1994).

Species	Hyphal system	Hyphae	Setae	Spores (µm)
Fistulina hepatica	monomitic	clamped	absent	3.5 – 4.5 x 2.5 - 3
Ganoderma resinaceum	trimitic	clamped	absent	9 – 12 x 4 - 7
Inonotus dryadeus	monomitic	unclamped	present	6 – 8 x 5 - 7
Laetiporus sulphureus	dimitic	unclamped	absent	5 – 8 x 4 - 5
Piptoporus quercinus	dimitic (context)	clamped	absent	6 – 8 x 2.5 – 3.5

Ecology

Substrata. *Piptoporus quercinus* has only been reported growing on oaks, mostly *Quercus robur* and *Q. petraea* in Europe, though Kotlaba & Pouzar (1966) reported it as occurring more rarely on *Q. cerris*. Kotlaba (1984) gave the substrata of 46 Czech and Slovak collections as 25 on unspecified *Quercus* spp., 16 on *Q. petraea*, 13 on *Q. robur*, and 2 on *Q. cerris*. Published Asian reports do not specify the oak species.

The oak polypore causes a 'brown rot' of the heartwood and is presumed to be saprotrophic (ie living off already dead matter) rather than parasitic. Oak heartwood contains a number of phenolic and other toxic or antifungal extractives, making it difficult or impossible for most wood-rotting fungi to break it down. This is the reason why old, fallen, oak heartwood can persist under natural conditions for more than a century (Cooke & Rayner 1984).

Piptoporus quercinus is one of comparatively few specialized species capable of decaying such wood. In common with other 'brown rot' fungi, it breaks down cellulose into simpler, easily assimilated sugars whilst leaving the lignin intact, probably by releasing a chemical solvent, hydrogen peroxide, using trace iron within the wood as a catalyst (Montgomery, 1982). Rotten wood is brown, often cubically cracked, and powdery not stringy.

Based on the appearance of fruitbodies, the species is known to occur on the following types of oak wood:

1. **Old, typically 'veteran', living trees**. A veteran oak is typically more than two metres in diameter at breast height, has a lot of dead attached wood in the canopy, has hollows, decay holes, and areas of exposed heartwood, and may once have been pollarded (Read 2000). It looks ancient, is probably more than 250 years old, and is likely to be a haven for wildlife.

   On such trees, fruitbodies have been seen on the edges of exposed heartwood, eg where limbs have fallen or been removed, where the trunk has been damaged, or where heartwood has been exposed by burning. More rarely, fruitbodies have been seen in smaller knotholes or emerging through bark. They have also been found in hollows. Some 'top rot' fungi typically produce fruitbodies high up, whilst 'butt rot' species tend to produce fruitbodies at ground level. Fruitbodies of *Piptoporus quercinus* are typically above ground, but are often said to occur low on the tree (eg Pilát 1936). Kotlaba & Pouzar (1966), however, noted a specimen at 15m, the Sherwood Forest specimen (listed below) required a ladder to examine it, and other reports are of specimens high up (Martyn Ainsworth, pers. comm.)

2. **Old, dead standing trees**. Some fungi only attack heartwood of living trees, not the heartwood of dead trees which changes in chemical composition and water content. *Piptoporus quercinus* is capable either of persisting in or of colonizing heartwood of dead trees. In parkland trees, such wood is often highly exposed and subject to drying out and heat stress. The production of chlamydospores (noted above) may enable the fungus to persist in adverse conditions, giving it a competitive advantage in this specialist niche (Martyn Ainsworth, pers. comm.).

3. **Fallen trunks of old trees**. Fungi colonizing dead standing wood are often replaced by different species when the wood falls to ground. *Piptoporus quercinus* persists, however. It may be worth noting that specimens have several times been seen on partly burnt wood, though this may be coincidental.

4. **Fallen limbs of old trees**. Some fungi require whole trunks as a resource and will either not survive in or not fruit on detached branches or limbs. *Piptoporus quercinus*, however, has been found fruiting on quite small (*c*15cm diameter) fallen limbs and logs.

5. **Long-fallen limbs and trunks**. Fruitbodies have been found on wood green with algae, moss, and lichens, estimated to have fallen at least 40 years earlier. It is assumed that the fungus has persisted for this time, rather than being a recent colonist, but this is not proven.

As far as can be ascertained, fruitbodies of the oak polypore have not been found on young or even quite mature oaks. Non-fruiting does not necessarily mean that the fungus itself is absent from such trees, but it is assumed that this is probably the case. It is possible, however, that the fungus is present as an endophyte in younger trees (ie as non-fruiting hyphae in the xylem).

Habitat

Since fruitbodies have only been found on old or extremely old 'veteran' oaks (ie 250 years old or more) and their remains, it is presumed that the habitat or potential habitat for *Piptoporus quercinus* is wherever such oaks occur.

The ability of the fungus to colonize or persist in highly exposed conditions means that ancient oak trees in mediaeval forests, deer parks, wooded commons or woodland pasture are certainly suitable and possibly preferential habitats. Known sites include Windsor Great Park, Richmond Park, and Moccas Park (see distribution, below).

The fungus will, however, grow on old oaks or their remains in quite dense woodland, even including a young spruce plantation at Windsor, High Standing Hill. Whether it merely persists in dense woodland or can colonize and maintain a population under such conditions is as yet unknown.

Seasonality

In England, growing fruitbodies typically appear from July into August, occasionally starting in late June. Old 'dead' fruitbodies may persist throughout the autumn and even into the following year, though in a blackened, decayed or mummified state (several such were seen in January and February 2001). Kotlaba (1984) noted over 75% of Czech and Slovak collections were made in July and August.

Fruitbodies do not necessarily appear every year. During regular examination of known sites at Windsor since 1997, only one fallen trunk was found to produce fruitbodies annually (Martyn Ainsworth, pers. comm.). It is possible that gaps in fruiting may be very substantial,

though this is not proven. No conspicuous fruiting was noted at Windsor Great Park between 1971 and 1985, for example, and there appear to be no British records of the fungus between 1910 and 1967 (see distribution, below).

When they appear, fruitbodies are often abortive and fail to form a hymenium (pores). They are also eaten by invertebrates (possibly also mammals) and may only last a few weeks (Martyn Ainsworth, pers. comm.).

Colonization and dispersal

No study of colonization and dispersal strategies appears to have been made for *Piptoporus quercinus*. Colonization is unlikely to be hyphal (ie by rhizomorphs from tree to tree), as happens in some wood-rotting fungi which initially attack root systems (eg the honey fungus *Armillaria mellea* and *A. ostoyae*). Instead it seems probable that colonization is by basidiospores released from fruitbodies or, less probably, by chlamydospores originating from the mycelium within the wood or from old fruitbodies.

The taxonomically related birch polypore *Piptoporus betulinus* is estimated to produce 31,000,000 basidiospores per square centimetre of hymenium per hour, or around 2,000,000,000 spores per day for a typical fruitbody (Kramer 1982). Spore production by *Piptoporus quercinus* may not be similar, but such large figures are not unusual for polypores. If it is roughly similar and if airborne dispersal is the normal strategy for colonization of new sites, *Piptoporus quercinus* should be capable of colonizing any suitable nearby habitats, certainly within hundreds of metres and possibly at greater distances.

Dispersal of chlamydospores, if it occurs at all, could only be through insect vectors since the spores are produced inside the wood or in old fruitbodies and are not actively released. It is not known which, if any, insects feed on the oak polypore and might therefore be potential vectors of dispersal. Given its apparent rarity, it is most probably consumed by generalist fungus feeders (*Diptera* or possibly *Lepidoptera*) rather than host-specific species (Keith Alexander, pers. comm.), but this remains to be investigated.

Distribution in Europe and Asia

Europe. The oak polypore is said to be "rare but widespread" in Europe (Ryvarden & Gilbertson 1994). It is reported (Ryvarden & Gilbertson 1994) to be present in Austria, Belorussia, Bulgaria, Croatia, the Czech Republic (see Kotlaba & Pouzar 1966 and Kotlaba 1984 for details), Denmark (see Vesterholt & Knudsen 1990 for details), France, Germany (see Krieglsteiner 2000 and Wöldecke 1998 for details), southern Norway, Poland (see Domański *et al* 1967 for details), Portugal, Roumania, Russia, Slovakia (see Kotlaba & Pouzar 1966 and Kotlaba 1984 for details), Sweden, Switzerland, and Ukraine. It is additionally reported from Lithuania (Gricius & Matelis 1996). Kotlaba & Pouzar (1966) considered it "a species with a submediterranean-subatlantic distribution". It is, however, not listed in standard modern works on the polypores of Italy or Spain, though Pilát (1936) considered sterile growths on oak from Italian mines to belong to this species.

Asia. The oak polypore is reported from Turkey (Niemelä & Uotila 1977), Georgia and Azerbaijan in the Caucasus (Bondartsev 1953), the Amur area of Siberia (Lyubarskii & Vasil'eva 1975), and Japan (Ito 1955).

The oak polypore is not known from North America.

Distribution in England: pre-1970 specimens and reports

The following information is based on dried herbarium specimens in the British national collections at the Royal Botanic Gardens, Kew, and from reports in published sources (as noted). Estimated grid references have been added to help refind locations, but may not be accurate. The list is alphabetical by county.

Berkshire: Windsor Forest.

Cranbourne Chase. SU 96 73. There is a specimen in the herbarium at Kew collected by Ted Green, Sept. 1967. Cranbourne Chase remains a site for the oak polypore (see post-1970 records below).

Silwood Park. SU 94 68. There is a specimen in the herbarium at Kew collected by Ted Green, 23rd Aug. 1967, on a living oak.

Cheshire: Eaton Hall. SJ 40 60. A specimen was said to have been collected and put on display by D. Mackenzie during the British Mycological Society's autumn foray in Sept. 1910 (Anon 1911).

Kent: Hayes Common. TQ 40 65. There is a specimen in the herbarium at Kew collected by Mrs T.J. Hussey *c*1845 (as *Polyporus quercinus*). This was illustrated in Hussey (1847) and was said to occur with the beefsteak fungus *Fistulina hepatica*.

Kent: Knole Park, near Sevenoaks. TQ 54 53. One specimen in the herbarium at Kew collected by Prof. C.T. Ingold, 9 Sept. 1969, on oak (as *Buglossoporus quercinus*). No other information.

Lancashire: Knowsley. SJ 45 94. Recorded in Higgins (1858) "on a very ancient oak". No other information.

Norfolk: Castle Rising. TF 64 25. There are two specimens in the herbarium at Kew collected by C.B. Plowright in 1871 and 1873 (as *Polyporus quercinus*). The species was listed without further comment in Plowright (1873). No other information.

Norfolk: Sparham. TG 09 19. There is a label in the herbarium at Kew from C.B. Plowright's herbarium referring to a specimen (eaten by insects before receipt) collected by F. Norgali (?) in 1876 (as *Polyporus quercinus*). No other information.

Northamptonshire: Apethorpe. TL 00 95. A collection by Rev. M.J. Berkeley "on old oaks, with *Fistulina hepatica*" was reported in Berkeley (1860) (as *Polyporus quercinus*). There is an unlocalized specimen of Berkeley's in the herbarium at Kew which may be this collection.

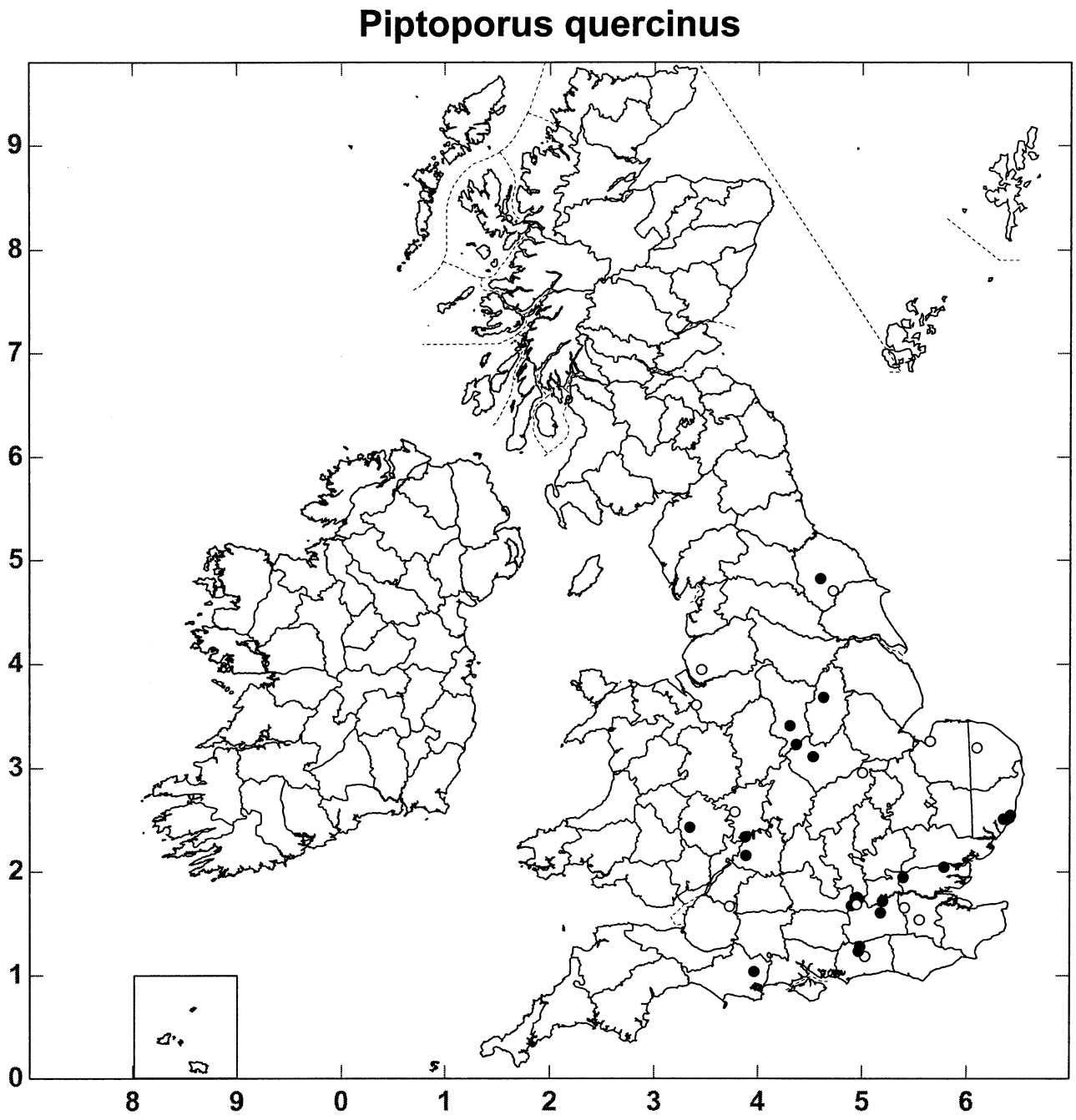
[excluded] Oxfordshire: Blenheim Park. One specimen in the herbarium at Kew collected on beech *Fagus sylvatica* by W.P.K. Findlay in 1949 (as *Polyporus quercinus*). Cartwright (1951) published a brief paper on this collection calling attention to its unusual substratum and giving details of the fungus in culture, including the fact that it produced a white rot. Since the oak polypore is not known to occur on beech and produces a brown rot, the specimen has been re-examined and redetermined (2001) by the current writer and Prof Leif Ryvarden as *Polyporus varius*.

Somerset: Weston, near Bath. ST 72 66 and adjacent squares. One specimen in the herbarium at Kew collected by Mr Drummond on oaks in 1877 (as *Polyporus quercinus*). No other information.

West Sussex: Stopham, near Pulborough. TQ 02 18 and adjacent squares. One specimen in the herbarium at Kew collected by C.H. Spencer-Perceval in 1876 (as *Polyporus quercinus*). No other information. Only four to five 1 km squares might reasonably be referred to "Stopham", since the hamlet is close to both Pulborough and Fittleworth. The site was visited (Jan 2001) on the off-chance that the location might still be evident. Stopham House would seem to have been the most likely location, with a few potentially suitable oaks alongside the road and visible along hedgerows. There are several extensive woodlands and two deer parks (Petworth and Parham) within 10 miles or so of this site which may be worth investigation. In addition, N.W. Legon (pers. comm.) believes he saw specimens in this area on 4 Aug. 1975 on a fallen oak trunk, but at the time did not appreciate their rarity.

Worcestershire: Broadheath to Berrow Green Road. near SO 77 57. There is an original colour painting of Carleton Rea's in the library at Kew showing fruitbodies "on oak log" dated May 1889 (as *Polyporus quercinus*), but there is no accompanying specimen in the herbarium.

Yorkshire: Castle Howard. SE 71 70. A collection was listed (as *Polyporus quercinus*), without comment or details, in a report of a fungus foray in Sept. 1892 (Massee 1892). What is presumed to be the same collection is listed in Massee & Crossland (1905), Mason & Grainger (1937), and Bramley (1985).



Piptoporus quercinus: recorded distribution in England.
o = records pre-1970; • = records post-1970 (inc 2001 additions).

Distribution in England: post-1970 specimens and reports

The following information is based on dried herbarium specimens in the British national collections at the Royal Botanic Gardens, Kew, from reports in published sources (as noted), and from first-hand accounts. The list is alphabetical by county. The contract period for the present report did not cover the fruiting period of the oak polypore, but nonetheless precisely known locations (except Swinley Park) were visited by the present author in January and February 2001 to try to gain a better idea of the known habitat for the species.

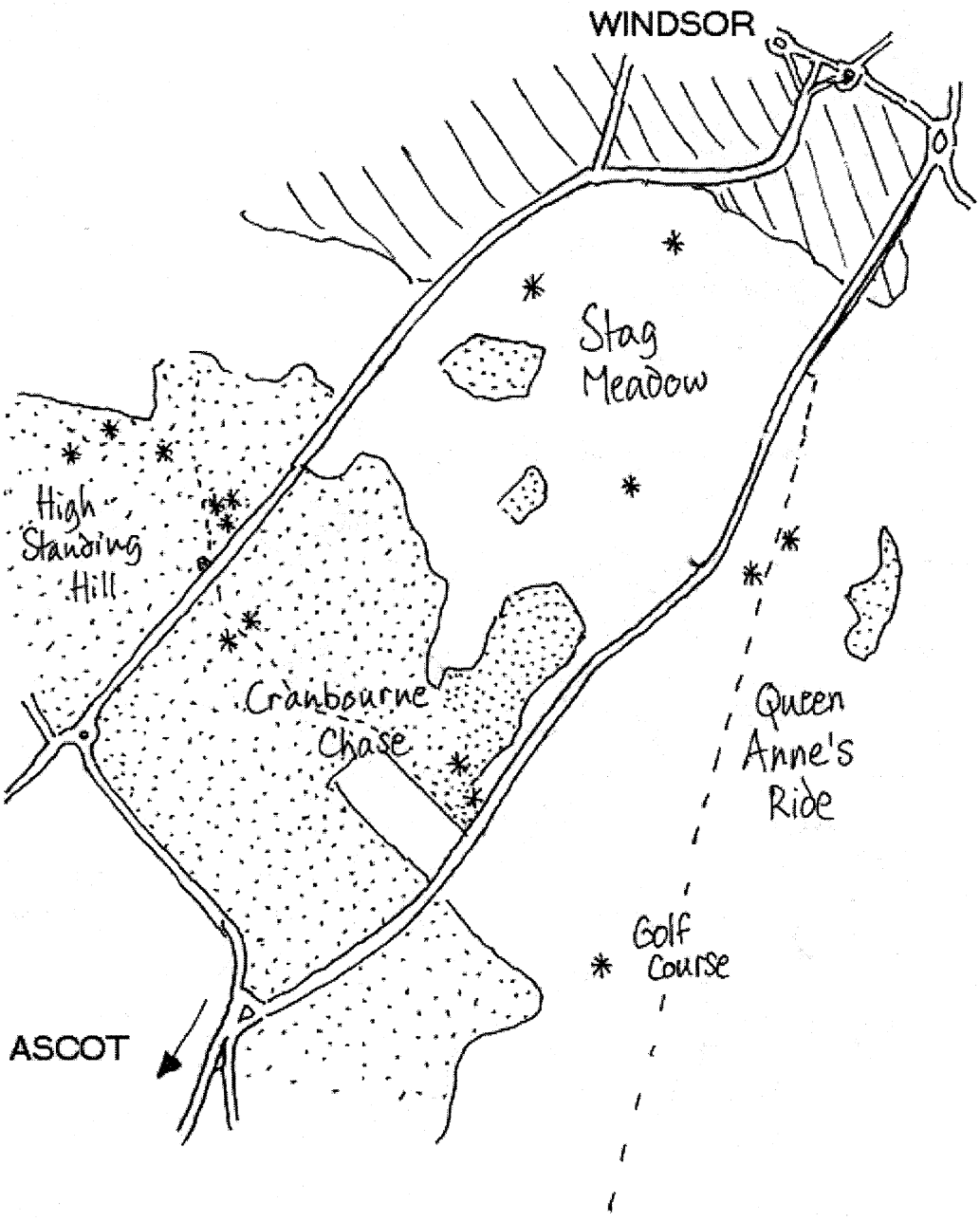
Further reports (July-Sept, 2001) obtained after the contract period, have been added in brief.

The following details are provided, where known:
Contacts: where possible, one or more suggested contacts are listed who either have precise knowledge of the location of the oak polypore or are leaders of local fungus recording groups who may be able to advise on or help locate the fungus. English Nature site contacts are also included.
Site status and ownership: as indicated.
Site description: a brief description of the general area.
Current management: this is based on the perceived management, not inside knowledge of current and long-term plans.
Oak polypore records: known locations are listed in detail. Since the contract period did not coincide with the fruiting season of the oak polypore, no search could be made for locations not already known.
Grid ref.: six-figure grid references are given where locations are precisely known, four-figure references where only the general area is known.
Oak polypore habitat: a brief description of the habitat immediately around the location.
Other fungi present: very few macrofungi were in evidence at the time of visit. Ideally, each location needs regular revisiting (particularly in the autumn) over a period of years to ascertain more precisely what other macrofungi are present in company with the oak polypore.

Berkshire: Windsor Forest & Windsor Great Park

Over 20 locations are known for the oak polypore in the Windsor-Ascot area. This is therefore by far the most important known site for this species in England, and quite possibly in Europe. The careful recording is thanks to Ted Green and Martyn Ainsworth, who have been systematically looking for the fungus and keeping track of the trees and fallen wood (each of which has been given a code, eg 'SM1') on which fruitbodies are known to occur. The area was visited with Martyn Ainsworth in Jan. 2001. Martyn has some additional and updated records for the year 2001.
Mycologist contacts: Dr A.M. Ainsworth (Martyn.Ainsworth@terragen.co.uk)
E.E. Green (Ted.Green@care4free.net)
Contact for site permission via Crown Estates Office, Windsor.

Windsor Great Park & Forest
*Approximate location of sites



Cranbourne Chase

***Grid ref.*:** SU 93 73 & SU 94 72 (six figure refs below).
Site status and ownership: SSSI; Royal Forest and Royal Park. Ownership: Crown Estates.
Site description: the eastern part of the site (C3 & C4) is public access comprising fairly open woodland, with a mix of old and young trees (including limes and oaks) and invasive bracken and scrub. The western part (C1 & C2) has no public access and is denser woodland.
Current management: 'damaged' trees (see C3 below) and fallen wood appear to be left in situ. Management is advised by Ted Green. Fallen trees and limbs near paths or carparks may be particularly vulnerable to inadvertent removal or tidying. Rangers and those working in the park need to be made formally aware of the status of the oak polypore and consideration given to adding warning signs to vulnerable fallen trees and limbs to prevent removal.
Oak polypore records: five locations, as follow:

C1 On old, fallen, moss-covered, decorticated trunk (*c*1m diam) Fruitbodies seen 24th June 2000. Photograph held by Martyn Ainsworth.
Grid ref.: SU 937 737
Oak polypore habitat: trunk in woodland, among undergrowth some metres away from path. Other larger fallen trunks nearby.
Other fungi present: none seen in Jan. 2001.

C2 On fallen, decorticated limb (*c*25 cm diam.) from old standing tree. Photograph held by Martyn Ainsworth.
Grid ref.: SU 936 737
Oak polypore habitat: limb and tree on woodland pathside. Limb might easily be 'tidied up' or cleared in such a position.
Other fungi present: none seen in Jan. 2001.

C3 On living tree, one side of which has been partly hollowed and burnt. Two fruitbodies seen on 13th Aug. 2000. Photograph held by Martyn Ainsworth.
Grid ref.: SU 947 728
Oak polypore habitat: the tree is in open woodland away from paths with other old oaks and limes, now extensively invaded by scrub and bracken (though this has been partly cut back).
Other fungi present: patches of the 'wet rot fungus' *Coniophora puteana* present in Jan. 2001. Martyn Ainsworth has previously recorded the rare wood-rotting poroid fungus *Ceriporia metamorphosa* on the same tree.

C4 On fallen tree. Remains of fruitbodies were found by Ted Green on the decorticated trunk on 25th Oct. 1999. Part of the tree has been burnt.
Grid ref.: SU 947 727
Oak polypore habitat: the fallen tree is in an exposed position in open grassy ground just a couple of metres from the edge of a busy car park.
Other fungi present: the wood-rotting, bracket-like *Stereum hirsutum* present on a limb in Jan. 2001.

An additional, unlocalized specimen from Cranbourne Chase is in the herbarium at Kew, collected by Ted Green in Sept. 1974.

Golf Course

***Grid ref.*:** SU 95 72 (six figure ref below).
***Site status and ownership*: SSSI;** Royal Park. Ownership: Crown Estate
***Site description*:** open parkland.
***Current management*:** though in an exposed position, the dead tree (see below) has been left standing. Ted Green has advised park and golf course management of the importance of this tree. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed with confirmation that the tree will be left in place should it fall and that fallen limbs and wood will also be left in situ.
***Oak polypore record*: GC1** On dead standing tree. A cluster of fruitbodies was seen on 5th August 1999 about 1m above the ground. A colour photo was published in Green (2000). No fruitbodies appeared in 2000.
***Grid ref.*:** SU 953 722
***Oak polypore habitat*:** open position, near path, on the immediate edge of the golf course within a few metres of outbuildings.
***Other fungi present*:** none seen in Jan. 2001.

High Standing Hill

***Grid ref.*:** SU 93 74 (six figure refs below).
***Site status and ownership*:** Royal Forest.
***Site description*:** fairly dense woodland with no public access. Parts are planted with conifers.
***Current management*:** 'damaged' trees (see HSH5 below) and fallen wood appear to be left in situ. Management is advised by Ted Green. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen limbs and wood will be left in situ. Warning signs may be needed at particularly vulnerable locations.
***Oak polypore records*:** six locations, as follow:

HSH1 On old fallen trunk (fallen at least 40 years, *fide* Ted Green) *c*1.5 m diam. Has fruited every year from 1997 to 2000. Remains of two rotten fruitbodies still visible in Jan. 2001. Photographs held by Martyn Ainsworth (fruitbodies seen on 13th - 18th July 1998; 29th June - 31st July 1999; 2nd July 2000). A specimen from 1998 is in the herbarium at Kew.
***Grid ref.*:** SU 934 744
***Oak polypore habitat*:** the trunk is in a fairly open position alongside a path at the edge of plantation cypress.
***Other fungi present*:** none seen in Jan. 2001.

HSH2 On old, decorticated, moss-covered log (*c*1 m diam.). Fruitbodies have variously appeared on both sides and at one end. Six fruitbodies in July 1998; one on 29th June 1999, eaten away by 14th July; new fruitbody seen 14th July, gone by 31st July; one fruitbody seen 2nd July 2000. Photographs held by Martyn Ainsworth.
***Grid ref.*:** SU 936 742
***Oak polypore habitat*:** log is in a fairly open position at edge of a grassy path.
***Other fungi present*:** none seen in Jan. 2001.

HSH3 On very old, moss- and lichen-covered, fallen trunk (*c*1 m diam.). Remains of fruitbody found 21st Aug. 1999; fresh fruitbodies seen 2nd July 2000.
***Grid ref.*:** SU 931 741
***Oak polypore habitat*:** the fallen trunk is in a dense, young spruce plantation.

Other fungi present: none seen in Jan. 2001, but Martyn Ainsworth has previously seen fruitbodies of *Fistulina hepatica* and *Laetiporus sulphureus* on the same trunk.

HSH4 On very old, moss- and lichen-covered, fallen limb (quite narrow, *c*20 cm diam.) separated from fallen trunk. Two fruitbodies seen 7th July 2000.
Grid ref.: SU 937 741
Oak polypore habitat: limb is lying among undergrowth in deciduous woodland.
Other fungi present: none seen in Jan. 2001.

HSH5 On living tree with area of exposed heartwood Three fruitbodies seen at edge of exposed area 15th July 2000. Photograph held by Martyn Ainsworth.
Grid ref.: SU 937 741
Oak polypore habitat: in deciduous woodland (near HSH4 above).
Other fungi present: none seen in Jan. 2001.

HSH6 On very old, moss- and lichen-covered, fallen limb (*c*30 cm diam.). Remains of old specimen seen in 2000.
Grid ref.: SU 933 745
Oak polypore habitat: limb is lying among undergrowth in deciduous woodland.
Other fungi present: none seen in Jan. 2001.

Queen Anne's Ride

***Grid ref.*:** SU 96 73 (six figure refs below).
Site status and ownership: SSSI; Royal Park. Ownership: Crown Estate
***Site description*:** the site is a grassy (unsurfaced) avenue of mainly old and veteran oaks in public access parkland.
Current management: some of the old avenue trees were destroyed as 'untidy' a few years ago, but this was stopped following public opposition. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen trunks, limbs and wood from these trees will be left in situ.
Oak polypore records: two locations, as follow:

QAR1 On live standing tree which appears old, but not ancient. Fruitbodies were seen on 13th Aug. 2000 emerging from callouses where a limb had been removed. Photographs held by Martyn Ainsworth.
Grid ref.: SU 961 738
Oak polypore habitat: in open position in grass at edge of ride.
Other fungi present: *Stereum hirsutum* present on an exposed root in Jan. 2001.

QAR2 On almost dead standing tree. Fruitbodies seen by Ted Green in the past, but not in recent years.
Grid ref.: SU 962 739
Oak polypore habitat: in open position in grass at edge of ride, but just behind the deer fence (deer present).
Other fungi present: none seen in Jan. 2001.

Stag Meadow

***Grid ref.*:** SU 95 74 & SU 95 75 (six figure refs below).
Site status and ownership: Royal Park.
***Site description*:** the site is parkland (public access) with ancient oaks and is on the immediate edge of the built-up area of Windsor.
Current management: old trees and dead standing wood appear to be left in situ. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen trunks, limbs and wood from these trees will be left in situ.
Oak polypore records: three locations, as follow:

SM1 On remains of a fallen tree. Fruitbodies were seen in 1999 (Ted Green) on a decorticated attached limb and in the hollow (somewhat burnt) of another attached limb. Photographs held by Martyn Ainsworth.
Grid ref.: SU 957 752
Oak polypore habitat: the fallen tree is in an exposed and sometimes flooded position in open grassland.
Other fungi present: none seen in Jan. 2001.

SM2 On live standing tree, which appears old but not ancient. A fruitbody was seen on the trunk about 3 m from the ground in 1985, a photograph of which was published (Green, 1993). It has not been seen since.
Grid ref.: SU 953 750
Oak polypore habitat: in open grassland with scattered old oaks.
Other fungi present: none seen in Jan. 2001.

SMa1 On fallen log, partly burnt. Fruitbodies were seen on 13th Aug 2000.
Grid ref.: SU 956 741
Oak polypore habitat: near footpath, among a small group of old and younger oaks in grassland.
Other fungi present: none seen in Jan. 2001.

Swinley Park

Grid ref.: SU 89 67
Site status and ownership: Swinley Park and Brick Pits SSSI; Royal Park. Ownership: Crown Estates.
***Site description*:** this area is south of Ascot and quite separate from the other Windsor sites above.
Current management: not known. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen limbs and wood will be left in situ. Warning signs may be needed at particularly vulnerable locations.
***Oak polypore records*:** six locations are known for the oak polypore here (contact Martyn Ainsworth for details), but were not visited in Jan. 2001. There is a specimen in the herbarium at Kew collected by Ted Green in Aug. 1971 and an old specimen collected, with Prof. Leif Ryvarden, in Oct. 1971. The location of these specimens has been refound, the tree still producing fruitbodies. Additionally, there is a specimen in the herbarium at Kew collected in 1974 by Ted Green from the 'South Forest', also presumed to be in this area.

Derbyshire: Calke Park, S. of Derby

Grid ref.: SK 36 22 and adjacent squares.
Site status and ownership: SSSI; National Trust. Contact: Calke Abbey, Ticknall, Derby DE73 1LE. Tel. 01332 863822.
Site description: the site was briefly visited in Feb. 2001 en route from the Nottinghamshire site (below). The presumed location for the oak polypore record is parkland and several 'stag-headed' veteran oaks could be seen near the Abbey (*c*SK 373 225). Old field boundary oaks, some dead or partly dead, are quite common at the edge of the park and in the surrounding farmland, together with younger oaks.
Oak polypore record: There is a specimen in the herbarium at Kew collected by Maurice Rotheroe on fallen oak during a British Mycological Society foray in Sept. 1990 (noted in Ing 1991). The precise tree does not seem to be known.
Current management: not known, but at least some old trees and fallen wood appear to be left in situ. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen limbs and wood from suitable oaks will be left in situ. Effort should be made to re-locate the fruiting tree.
Mycologist contact: North West Fungus Group, c/o Rita Cook, 1 Summerville Gardens, Stockton Heath, Warrington, Cheshire WA4 2EG. The area seems promising and should be systematically explored at the right time of year (ie July/August).

Derbyshire: Kedleston Park

Grid ref.: SK 306402
Site status and ownership: National Trust (outside the SSSI).
Site description: "open parkland".
Oak polypore record: 20 Aug. 2001: on ancient oak. Keith Alexander.
Site added after contract period; no further details.

Dorset: part of Kingston Lacy estate

Grid ref.: ST 96 03 (six figure refs below).
Site status and ownership: National Trust. Contact: Kingston Lacy, Wimborne Minster, BH21 4EA. Tel. 01202 883402.
Site description: the site is small block of oak (with lime and other trees), possibly old, overgrown pasture woodland, to the west of King Down Farm. It is surrounded by arable farmland. There is a public bridlepath along one edge.
Current management: appears undisturbed, with old trees and fallen wood left in situ. Ted Green is advising on management. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen limbs and wood will be left in situ.
Mycologist contacts: E.E. Green (Ted.Green@care4free.net).
Also Southern Fungus Survey Group, c/o John Keylock, Sunnyside, East Street, Crewkerne, Somerset TA18 7AG.

Oak polypore records: eight locations are known for the oak polypore, making this site the second richest in England to date. The fungus was initially seen by Ted Green on 23rd June

2000, with additional specimens seen on subsequent visits in 2000 by Ted Green and Alan Lucas and by Ted Green and Martyn Ainsworth. The site was visited with Ted Green, Martyn Ainsworth, and Jill Butler in Feb. 2001. The locations are as follow:

KL1 On living tree. Fruitbody had been seen on heartwood exposed by a fallen limb.
Grid ref.: ST 966 036
Oak polypore habitat: at wood boundary, in small strip of woodland between arable field and bridlepath.
Other fungi present: none seen in Feb. 2001.

KL2 On old, moss-covered, fallen log.
Grid ref.: ST 967 037
Oak polypore habitat: among dense undergrowth in woodland.
Other fungi present: none seen in Feb. 2001.

KL3 On old, fallen trunk. Blackened remnants of fruitbodies were still in evidence in Feb. 2001.
Grid ref.: ST 967 037
Oak polypore habitat: among dense undergrowth in woodland.
Other fungi present: a wood-rotting, effused *Hymenochaete* species was seen in Feb. 2001, together with effused fruitbodies of a *Botryobasidium* species.

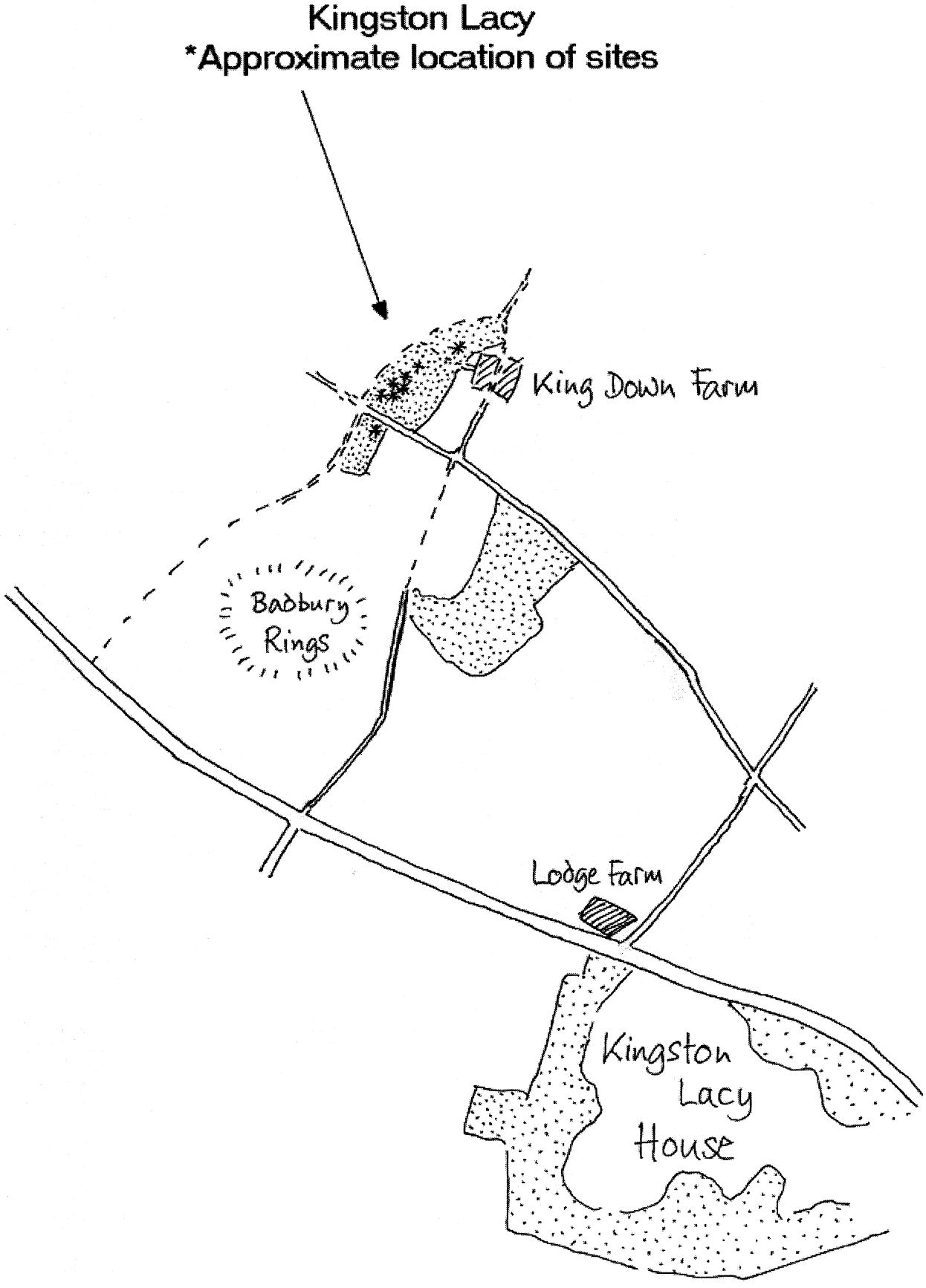
KL4 On living tree. Fruitbody had been seen on heartwood exposed by fallen limb.
Grid ref.: ST 967 037
Oak polypore habitat: in woodland
Other fungi present: none seen in Feb. 2001.

KL5 On old, mossy, fallen trunk, almost entirely overgrown.
Grid ref.: ST 968 038
Oak polypore habitat: among dense undergrowth in woodland.
Other fungi present: none seen in Feb. 2001.

KL6 On old but recently fallen limb.
Grid ref.: ST 968 038
Oak polypore habitat: among dense undergrowth in woodland.
Other fungi present: none seen in Feb. 2001.

KL7 On small piece of old, mossy, fallen limb (*c*15cm diam.). Several rotten fruitbodies were still visible in Feb. 2001.
Grid ref.: ST 968 038
Oak polypore habitat: among dense undergrowth in woodland. The piece of wood was by far the smallest seen supporting the oak polypore.
Other fungi present: none seen in Feb. 2001.

KL8 On base of large, decorticated fallen trunk. Fruitbody had been seen on the remains of the root mass.
Grid ref.: ST 969 038
Oak polypore habitat: in woodland, alongside farmtrack.
Other fungi present: none seen in Feb. 2001.


Kingston Lacy
*Approximate location of sites
King Down Farm
Badbury Rings
Lodge Farm
Kingston Lacy House

Essex: Danbury Common, near Chelmsford

Grid ref.: TL 78 04 and adjacent squares.
Site status and ownership: SSSI; common land owned by National Trust. Also Nature Reserve managed by Essex Naturalists' Trust.
Site description: the site was briefly visited in Feb 2001 en route from the Suffolk site (below). It mostly appears to be heath with birch and apparently youngish oak (though some long coppiced). No obvious old timber oak was seen. Ancient oak pollards occur along the boundaries.
Oak polypore record: A collection on oak was reported by Prof. Bruce Ing on 11 Sept. 1984 (listed in Minter 1985). No further information.
Current management: not known, but the site appears to be primarily conserved as heathland. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Effort should be made to rediscover the precise location.
Mycologist contact: Essex Fungus Group, c/o Tony Boniface, 40 Pentland Avenue, Chelmsford, Essex CM1 4AZ. The area should be systematically explored at the right time of year (ie July/August). If old timber oak is absent, the most likely place to look for the oak polypore is on old coppice stools.

Essex: Epping Forest

Grid ref.: TQ 396945
Site status and ownership: Corporation of London.
Site description: this part of the forest is ancient pasture woodland, close to the road into Chingford, with easy access to public.
Oak polypore record: 17 Aug. 2001: two clusters of brackets c 1.5m up on trunk of living tree, growing on exposed heartwood. Peter Roberts. (Photos taken a couple of days later by the forest ranger, Jeremy Dagley; published in Field Mycology, Oct 2001 issue.)
Site added after contract period; no further details.

Gloucestershire: Brockworth

Grid ref.: SO 882152
Site status and ownership: private.
Site description: ploughed field, possibly to be incorporated in a housing development.
Oak polypore record: 27 Aug. 2001: on fallen wood under ancient tree. Ted Green & Keith Alexander.
Site added after contract period; no further details.

Gloucestershire: Forthampton Oaks

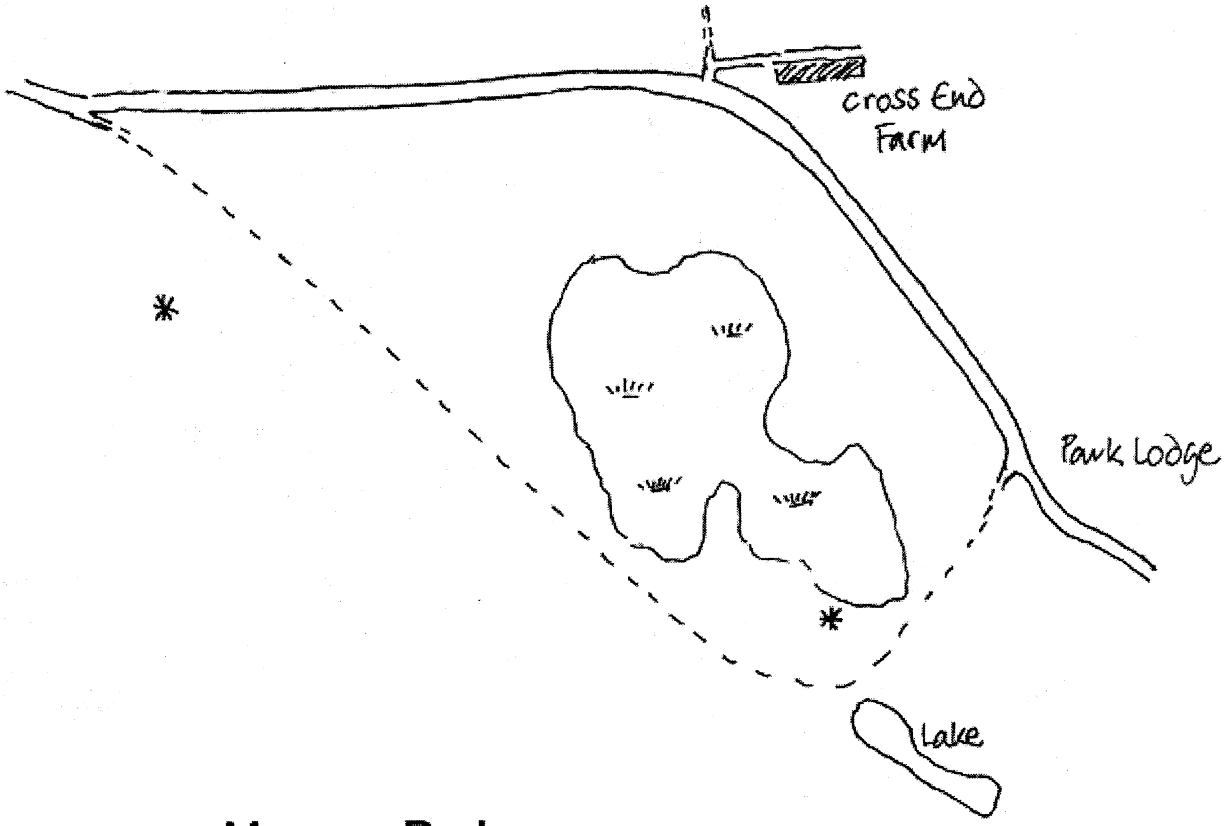
Grid ref.: SO 870322
Site status and ownership: private.
Site description: intensive farmland.
Oak polypore record: 27 Aug. 2001: on trunk of ancient oak. Ted Green & Keith Alexander.
Site added after contract period; no further details.

Hereford: Moccas Park

Grid ref.: SO 34 42 (six figure refs below).
Site status and ownership: privately owned; NNR; SSSI; a key conservation site (Grade 1, listed in Ratcliffe, 1977). EN contact for permits: Helen Stace, Hereford and Worcestershire Team, Bronsil House, Eastnor, Ledbury, Herefordshire HR8 1EP.
Site description: Moccas comprises some 140 ha of ancient deer park, containing oak and chestnut, on sandstone. The park is renowned for its veteran oaks and was the first parkland NNR to be created.
Current management: old trees and fallen wood are now left in situ. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen limbs and wood will be left in situ.
Oak polypore records: there are two locations on tagged and numbered trees; these are the basis for the record published (as *Buglossoporus quercinus*) by Blackwell (2000).

42 On old, standing *Quercus robur*, recorded by Ted Green, 10th Aug. 1994.
Grid ref.: SO 346 427
Oak polypore habitat: parkland near lake.
Other fungi present: Ted Blackwell recorded the beefsteak fungus *Fistulina hepatica* and the agaric *Collybia fusipes* on the tree on 18th Oct. 2000.

214 On veteran, fallen *Quercus robur*, recorded by Ted Green, 10th Aug. 1994.
Grid ref.: SO 341 428
Oak polypore habitat: parkland.
Other fungi present: Ted Blackwell recorded the beefsteak fungus *Fistulina hepatica*, the sulphur tuft toadstool *Hypholoma fasciculare*, the corticioid fungus *Phlebia tremulosa*, and the candlesnuff fungus *Xylaria hypoxylon* on the tree on 18th Oct. 2000. Further records on 26th November 2000 included *Stereum hirsutum* and a *Mycena* species (Shelley Evans).
Mycologist contact: Herefordshire Fungus Survey Group, c/o
Ted Blackwell, 7 Ashley Walk, Orleton, Ludlow, Shropshire SY8 4HD. Almost certainly *Piptoporus quercinus* will be found to be widespread at this site if systematically searched for at the right time of year (ie July/August).



Moccas Park
*location of trees 42 + 214

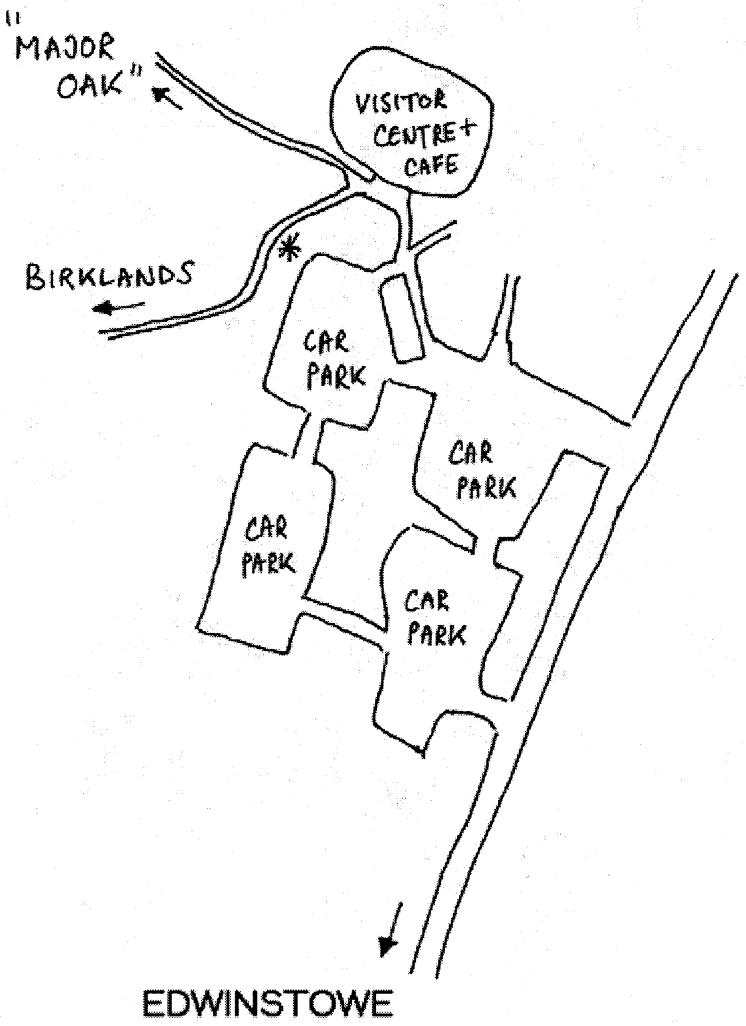
Leicestershire: Bradgate Park

Grid ref.: SK 526101
Oak polypore record: 4th Sept. 2001: single bracket inside hollow trunk of living tree (*Quercus robur*, probably old pollard). Peter Long, confirmed Peter Roberts.
Site added after contract period; no further details.

Nottinghamshire: Sherwood Forest Country Park, Birklands

Grid ref.: SK 628 675; tree tagged as 08044.
Site status and ownership: SSSI; a key conservation site (Grade 2, listed in Ratcliffe, 1977). The oak is known to English Nature (Steve Clifton, E. Midlands Team, 01476 568431).
Site description: Birklands is an area of oak-birch forest on sandstone with a large number of oaks of all ages (an 'exceptional population' according to Ratcliffe, 1977), including over 1000 living and dead veteran oaks and their remains.
Current management: old standing trees and fallen wood appear to be left in situ. Individuals responsible for authorizing ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen limbs and wood will be left in situ.
Oak polypore records: a collection was reported (Ing 1991) on a living oak (inspected by ladder) during a British Mycological Society foray in Sept. 1990. The oak is known, and was visited and photographed in Feb. 2001. It stands close to the car park nearest to the visitor centre along the Birklands trail and bears the number 08044. It is an old standing, 'stag-headed' living tree (ie whose trunk has died back at the top).
Oak polypore habitat: the immediate area is open woodland alongside a path, with other veteran oaks nearby. Fallen wood appears to be left in place. The oak is separated from the car park by a bank and fence.
Other fungi present: none seen at the time of visit, but the tree needs to be examined in the summer and autumn.
Mycologist contacts: Nottingham Fungus Group, c/o Paul Nichol, Strawberry Howe, 14 Horncastle Road, Woodhall Spa, Lincolnshire LN10 6UZ. Almost certainly *Piptoporus quercinus* will be found to be widespread at this site if systematically searched for at the right time of year (ie July/August).

Sherwood Forest
*Approximate location of site

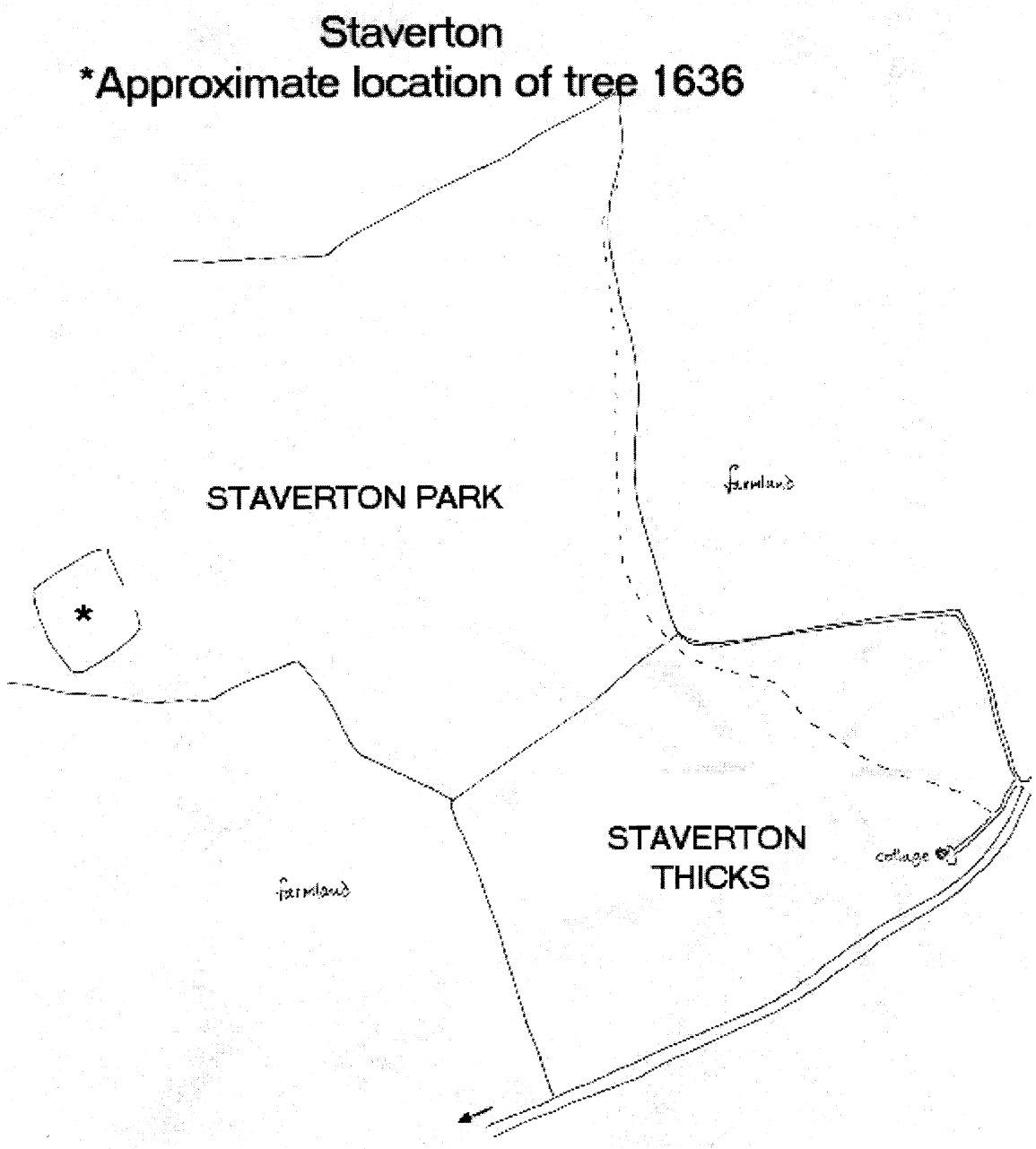


Suffolk: Captain's Wood

Grid ref.: TM 424543
Site status and ownership: private.
Site description: 'small site with lots of veteran trees'.
Oak polypore record: Aug. 2001: five specimens, on two standing and three fallen trees. Carl Borges & Alison Collins, confirmed Martyn Ainsworth.
Site added after contract period; no further details.

Suffolk: Staverton Park, near Tunstall

Grid ref.: TM 353 507.
Site status and ownership: SSSI privately owned by Kemball family, Wantisden Hall. The location is a key conservation site (Grade 1, listed in Ratcliffe, 1977).
Site description: the site was visited in Feb. 2001, though since shooting was taking place in the area concerned it was not possible to see the known tree. The Park as a whole, however, is some 85 ha., chiefly oak woodland on sand, with an impressive number (over 4000) of ancient pollarded oaks with bracken undergrowth. The adjoining Staverton Thicks area is a denser area of ancient oaks and massive hollies (said to be the largest in England).
Current management: not known. Individuals responsible for authorising ground work should be made formally aware of the conservation status of the oak polypore. Management should be agreed and include confirmation that fallen limbs and wood from suitable oaks will be left in situ.
Oak polypore records: a) one specimen in the herbarium at Kew collected by R.E. Evans, 7 Sept. 1984, on wood (roots?) of oak (listed in Minter 1985). b) a second specimen recorded on an oak by Ted Green in 1994. This latter tree is in Block J (based on the 1994 tree survey) and bears the number 1636.
Mycologist contacts: Johnny Turner (johnny.turner@et.suffolkcc.gov.uk). Also Norfolk Fungus Study Group, c/o Tony Leech, 3 Eccles Road, Holt, Norfolk NR25 6HJ. The tagged oak (1636) is known to English Nature (Alison Collins). It seems probable that *Piptoporus quercinus* will be found to be widespread within the Park if looked for at the right time of year (ie July/August).
Addendum: July 2001: fruitbodies on one standing tree and one piece of fallen wood. Carl Borges & Alison Collins, confirmed Martyn Ainsworth.


Staverton
*Approximate location of tree 1636
STAVERTON PARK
farmland
*
STAVERTON
THICKS
cottage
farmland

Surrey: Ashstead Common

Grid ref.: TQ 176605
Site status and ownership: Corporation of London.
Site description: ancient pasture woodland, now ungrazed and dense. It contains around 2000 old, mostly pollard oaks.
Oak polypore record: 12 Aug. 2001: bracket inside 2m high, dead, hollow standing trunk (unnumbered). Peter Roberts.
Site added after contract period; no further details.

Surrey: Ebernoe Common

Grid ref.: SU 97 27 and adjacent squares.
Site status and ownership: SSSI
Site description: old mixed woodland.
Current management: not known. Effort should be made to search for the oak polypore at this site, and if located implement a suitable management policy.
Oak polypore records: Dr Brian Spooner reports having seen probable specimens high up on a standing oak in Aug. 1997. It is worth noting that Ebernoe Common is not far from Stopham, West Sussex (see pre-1970 sites above).
Mycologist contact: West Weald Fungus Recording Group, c/o George Preston, Silver Glen, Georges Lane, Storrington, Pulborough, West Sussex RH20 3JH.
Addendum: Aug. 2001: fruitbodies on two trees reported by Alf Simpson, estate manager, and confirmed by Pat Leonard.

Surrey: Richmond Park

Grid ref.: TQ 19 71 and adjacent squares.
Site status and ownership: SSSI (1992) and NNR (2000); Royal Park. Ownership: Crown Estates. Contact: Park Manager, Holly Lodge, Richmond Park, Surrey TW10 5HS. Tel. 0208 948 3209.
Site description: the site is a mediaeval deer park on the edge of London. According to the collector, the specimen noted below was most probably found within the 'Isabella Plantation', an area of the park which has been extensively gardened since the 1950s. This site was visited in Jan. 2001. A very few old trees remain within this fenced-off garden area, but immediately outside (within the park proper) are large numbers of veteran oaks, some living, partly living, dead and standing, or dead and fallen. There are large quantities of fallen heartwood left in situ. Younger oaks are present.
Current management: Isabella Plantation itself is gardened and 'tidy'; outside this area, however, old trees and fallen wood appear to be left in situ. Effort should be made to search for the oak polypore at this site, and if located agree a suitable management policy.
Oak polypore records: one specimen in the herbarium at Kew collected by E.W. Brown, 6 Aug. 1984, on stump (as *Buglossoporus quercinus*).
Other fungi present: based on previous autumn visits, at least a third of the ancient standing oak trees near Isabella Plantation have old fruitbodies of the beefsteak fungus *Fistulina hepatica* on them.
Mycologist contact: Peter Roberts (P.Roberts@rbgkew.org.uk). The area around Isabella Plantation, together with much of the rest of Richmond Park, seems a very promising site for further investigation at the right time of year (ie July/August).

Addendum: This site was visited by Alick Henrici and Peter Roberts (independently and coincidentally on 15th July), by Shelley Evans on 23rd July, and by Alick Henrici on 5th, 10th, and 24th August.

15 July 2001: tufted brackets, already mildewed, 1.5m up on trunk of live tree (numbered 2140). Alick Henrici.
15 July 2001: bracket, partly torn off and fallen, 1.5m up on trunk of live tree (numbered 0467). Alick Henrici.
15 July 2001: bracket, in crook of dead standing tree, some two metres high (numbered 0735). Peter Roberts
15 July 2001: bracket, low down on dead standing tree (numbered 0725). Peter Roberts
15 July 2001: bracket, low down on dead standing tree (numbered 0737). Peter Roberts
23 July 2001: bracket at base of dead hollow standing trunk (numbered 0764). Shelley Evans.
23 July 2001: 8 brackets (one inside) on dead hollow standing trunk (numbered 0758) protected by bracken. Shelley Evans.
5 Aug. 2001: large bracket 2m up on trunk of unnumbered live tree, with second smaller bracket 0.3m higher; TQ 192712, near Thatched House Lodge. Alick Henrici.
10 Aug. 2001: bracket on root at foot of almost-dead tree (numbered 0463), area towards Bog Gate. Alick Henrici.
24 Aug. 2001: three brackets on trunk of a standing tree, 2m, 3m, and 5m up, NE from Ham Gate (next to tree 0827). Alick Henrici.

West Sussex: Petworth Park

Grid ref.: SU 965230
Site status and ownership: National Trust.
Site description: deer park, landscaped in the 18th century, with scattered veteran oaks.
Oak polypore record: 29 July 2001 : 3 clusters of brackets on a detached, but still standing and living, section of a large split tree; Peter Roberts. Photo taken.
Site added after contract period; no further details.

Yorkshire: Duncombe Park, Castle Hill

Grid ref.: *c*SE 59 82
Site status and ownership: NNR (1994); SSSI.
Site description; open parkland including veteran trees most over 250 years old.
Current management: not known, although over 2,000 broadleaf seedlings including oak have been planted over the last 10 years. Efforts should be made to confirm the location of the oak polypore, and to then agree a suitable management policy.
Oak polypore records: Ted Green (pers. comm.) reports having seen the fungus here in 2000 on the side of a fallen, 1m diam. oak. No further details.
Mycologist contacts: E.E. Green (Ted.Green@care4free.net).

Management

As with almost all fungi, the best current management advice for the oak polypore consists of maintaining as far as possible the status quo (though such maintenance may require active work). Site managers should plan ahead and ensure there will be a continuous supply of oak trees representing a broad age range from seedlings to ancient. The immediate habitat around the trees is also important since nearby planting or felling, coppicing or shrub clearance may increase or decrease humidity, affect shade or sunlight, and so on. Until we know more about the biology and requirements of the species, any change may be counter-productive to both short term and long term sustainability.

Having said this, the oak polypore appears at least to be able to persist despite substantial change to its immediate environment, as indicated by the fruitbodies found on an old fallen oak in a young spruce plantation at High Standing Hill, Windsor. However whether it thrives or can remain viable in such a situation is unknown.

Based on the appearance of fruitbodies, the oak polypore is mainly if not exclusively found on oak, just as its close relative the birch polypore is mainly if not exclusively found on birch. The only published report (in Britain or overseas) that could be traced of the occurrence of oak polypore on a tree other than oak (Cartwright 1951) is based on a misdetermination.

Fortunately for the oak polypore, its preferred tree is common in England, though potentially threatened by *Phytophthora quercina*, a recently described cause of epidemic oak dieback in Europe (Jung *et al* 1999). Much less common (but equally threatened by *Phytophthora*) are the veteran oaks with which known fruiting of the oak polypore is associated. Whether *Phytophthora* is a direct cause of the die back or a symptom of stress caused by other factors is not fully understood.

Ancient oaks are "peculiarly English" and "seldom to be seen in most European countries" (Rackham 1980), suggesting that the oak polypore may have its world stronghold in England.

The oak polypore rots heartwood, even long-fallen heartwood, including the heartwood of comparatively small limbs. It can occur in company with the common *Fistulina hepatica* and *Laetiporus sulphureus*, so either it has its own heartwood niche (perhaps peripheral heartwood, perhaps wood that experiences extreme changes in water content) or can hold its own against the commoner species.

Maintaining the species in the short term is thus a question of maintaining old and veteran oaks, dead limbs and all, and allowing old fallen oak wood to remain in situ indefinitely (see Read 2000 for details and advice on good management).

Given the longevity of oaks, such maintenance should safeguard the oak polypore sites for the immediate future. For the long term, however, so little is known about the ecology of the species that we have no idea what constitutes a viable population. It may be, for example, that the oak polypore colonizes sparsely (perhaps in competition with other fungi) and may therefore require a certain number and area of old oaks to maintain itself at any given site. Where it occurs at sites with fragmented ancient oaks it may not be viable. It may also be that it colonizes rarely, and thus requires a continuous succession of younger and older oaks. Maintaining a balance of oaks of different ages in sufficient numbers is therefore a prudent management safeguard for future viability. Wholesale harvesting of oak plantations and

removal of mature oaks should be questioned and limited. At key ancient oak sites where no young seedlings are currently regenerating, it may therefore be necessary to encourage the growth of new trees, ideally from the veteran oaks' own acorns. Potentially negative factors such as deer grazing and mowing should be assessed and controlled.

Most if not all the current known sites (listed above) are fortuitously already afforded some level of conservation protection, the old oaks especially so through such groups as The Ancient Tree Forum and the Veteran Tree Initiative. The sites visited during this study appeared to be operating general management practices already beneficial to the oak polypore, such as leaving dead standing and fallen wood in situ. However it is strongly recommended that such policies are actively publicized as being vital management practices for the sustainability of the oak polypore. Apart from *Phytophthora*, the main current threats to the oak polypore would appear to be lack of awareness coupled with obsessive tidiness. The main future threat may be ever more draconian health and safety measures enforcing this obsession.

Oak polypore site management list

1. Search for and locate fruitings of oak polypore during July/early August each year (contact local mycologist for help, if required).
2. Photograph, and tag trees or fallen wood on which the oak polypore is found.
3. Communicate presence of the oak polypore to relevant individuals responsible for or likely to work on or near the site.
4. Ensure that legal requirements are met (under Section 8 of the Wildlife & Countryside Act) to protect the oak polypore and its fruiting site from damage or disturbance.
5. Report any new locations to English Nature.
6. Seek advice on measures to ensure long-term conservation of oak polypore on site (eg. oak regeneration, establishing new pollards).

Recommendations

A lot more research needs to be done concerning the distribution of the oak polypore in England and concerning its biology and ecology.

Distribution. The oak polypore has not been given a high profile and is almost certainly under-recorded. The two main sites for the species in England are based on records made by just two people (Ted Green and Martyn Ainsworth), mostly in the last three years. The main reason is the brief and irregular appearance of fruitbodies in July and early August when few mycologists, amateur or professional, actively look for polypores. The species is quite possibly ubiquitous with old oaks in England, but all we know at present is that it is widespread.

Interested parties (principally local naturalists and mycologists) should be encouraged to look for the species on local old oaks and oak remains in their area in July and early August, ie well before the autumn fungus-foraying and recording season normally begins. The starting point might be deer parks and old country house estates, but oak woodland, hedgerow oaks, and isolated field oaks should also be investigated.

Since very few people have ever seen an oak polypore and standard field guides rarely if ever include the species, it may be useful to produce a simple colour leaflet giving a description, illustration, and advice on when and where to look for it. It should also be possible to place illustrated articles on the oak polypore in appropriate magazines and journals, particularly those read by country landowners. Consideration must also be given as to who will check and collate any resulting records.

Even with some experience, the oak polypore is only recognizable in the field when fully developed and easily accessible. Fruitbodies (often aborted or gone-over) really need to be double-checked microscopically (only a small segment is needed) to avoid confusion with *Laetiporus*, *Fistulina*, and other commonplace polypores on oak. The inclusion of the fungus in Schedule 8 of the Wildlife and Countryside Act makes it an offence to intentionally pick, uproot or destroy the fungus. However, a licence can be obtained from English Nature to allow the collection of samples for the purpose of accurate recording. The potential threat to the fungus through collecting is unknown. However, taking a small segment of fruit body for identification purposes is unlikely to pose any threat to the species.

Research. At present we know almost nothing about the biology and ecology of the oak polypore. It would certainly be helpful to know the following:

1) **Is the fungus really restricted to old oaks or is it present (but simply not fruiting) in younger oaks?** If a technique can be developed which can isolate or identify the presence of *Piptoporus quercinus* in wood that is known to contain the species, then any piece of wood, young or old, could be tested. It should be remembered that fungal fruitbodies are often produced in response to stress. Stress-free *Piptoporus quercinus* may not be macroscopically visible. Perhaps it grows happily in young oaks and all we see is its stressful old age.

2) **How much oak does an oak polypore need?** Some fruitbodies have been found on comparatively small pieces of heartwood, but what is the typical size of individual

mycelia in wood? How much oakwood and how many oaks are required to maintain a local population?

3) **How diverse is the oak polypore population in England?** How many genets at any given site? How many genets throughout the country?

4) **How is the fungus dispersed?** We assume it is by wind-borne basidiospores, but if true, how do they penetrate the heartwood? Do the asexual chlamydospores play any role in dispersal (if so populations of the fungus might be clonal)? Is there a wood-boring insect vector? Could this be a rare beetle restricted to old oaks?

5) **How does the fungus interact with other species?** Field observations of fruitbodies suggest that *Piptoporus quercinus* can occupy the same piece of oak (limb or trunk) as other heart-rot species, notably *Fistulina* and *Laetiporus*. How does it compete for resources? Does *Piptoporus* occupy some specialist niche unavailable to the commoner species? Does it parasitize them?

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APPENDIX 1

Nomenclature & synonyms

Piptoporus quercinus is the current, most generally accepted name for the oak polypore, used in the standard work on European polypores (Ryvarden & Gilbertson 1994) and in the forthcoming Checklist of British Basidiomycetes.

The name *Buglossoporus quercinus*, has also been used for the same species. This was based on a proposal by Kotlaba & Pouzar (1966) that the oak polypore is sufficiently distinct from other species of *Piptoporus* to merit its own genus (*Buglossoporus*), since it has monomitic hyphae in the trama of the pore tubes, whereas species of *Piptoporus* have dimitic hyphae. The justification for such a split is doubtful, but may be resolved by further research.

The name *Buglossoporus pulvinus* was based on an assertion by Donk (1971) that the old name *Boletus pulvinus* referred to the oak polypore and therefore (under the 1821 starting point date then operating for fungal names under the Botanical Code), '*pulvinus*' (validated in 1825) should take precedence over '*quercinus*' (validated in 1838). This asserted synonymy is extremely doubtful, but is in any case academic, since a subsequent change to the starting point date (now moved back to 1753) makes '*quercinus*' (1794) earlier than '*pulvinus*' (1799) and hence the only valid epithet. The most recent paper on the nomenclature of the species was by Thorn (2000).

The synonymy for the oak polypore is as follows. Some of these names will have been used in older literature and recording lists.

Piptoporus quercinus (Schrad.) P. Karst., Medd. Soc. Fauna Flora Fenn. 6: 9 (1881).
Boletus quercinus Schrad., Spic. Florae Germanicae: 157 (1794)
Polyporus quercinus (Schrad.) Fr., Epicrisis: 441 (1838)
Placodes quercinus (Schrad.) Quél., Flore Mycol. France: 397 (1888)
Ungulina quercina (Schrad.) Pat., Essai Taxon.: 103 (1900)
Placoderma quercinum (Schrad.) Ulbrich, in Lindau, Kryptogamenfl. 1 (ed. 3): 159 (1928)
Buglossoporus quercinus (Schrad.) Kotlaba & Pouzar, Česká Mykol. 20: 84 (1966)
?Boletus pulvinus Pers., Obs. Mycol. 2: 7 (1799)
Buglossoporus pulvinus (Pers.) Donk, Proc. Kon. Nederl. Akad. Weten., Ser. C. 74: 4 (1971)
Polyporus cadaverinus Schulzer, in Fries, Hymen. Europ.: 544 (1874)
Polyporus venetus Sacc., Mycol. Veneta Spec.: 52 (1888)
Caloporus fuscopellis Quél., C.R. Ass. Franc. Av. Sci. 20: 469 (1891)
Polyporus fuscopellis (Quél.) Sacc., Syll. Fung. 11: 86 (1896)
Polystictus fuscopellis (Quél.) Bigeard & Guillemin, Fl. Champ. Super. France 2: 373 (1913)
Polyporus quercicola Velen., Českе houby: 646 (1922)