

THE FUNGI OF THE NEW FOREST

By J G MANNERS

INTRODUCTION

The profusion of mushrooms and toadstools in the New Forest each autumn is well known to anyone who visits the area. What is, perhaps, not so generally appreciated, is that the New Forest probably contains a greater variety of the larger fungi (such as mushrooms, toadstools, bracket fungi and puffballs) than most other British localities. In addition, there are several hundred different micro-fungi, that is fungi too small to be immediately obvious to the casual observer. They can, in general, only be studied with the aid of a microscope, and our knowledge of their presence and distribution within the Forest is very inadequate.

At first sight it may appear that the larger fungi are distributed at random in the woodlands, but with closer observation it soon becomes apparent that this is by no means the case. Some only occur on beech wood, others only on ground beneath birches, others on dung, and so on. Observation over a period of time reveals that in one particular habitat, such as a fallen beech, there is a succession of fungi, some only being present soon after the tree has fallen, others at later stages. The situation seems to be that fast-growing fungi, feeding on the sugar and starch present in newly fallen wood, appear first, to be followed later by others which feed on the wood itself, causing its decay and disintegration.

Some of the larger fungi appear regularly every year. Others seem to require very special conditions to produce their fruit bodies; they are probably present within the plant or in the soil in other years, but cannot be seen or identified until they grow out and fruit. This is one of the reasons why the list of New Forest fungi is certainly incomplete, even for the mushrooms and toadstools, which have been extensively studied: almost every year previously unrecorded types are found in places which have been visited regularly.

It is now becoming recognised that the New Forest is an outstandingly good area for fungi: there are several reasons for this.

1. The variety of habitat, including broad-leaved and coniferous woodland, dry and wet heath, open bog, alder-willow bog woodland and lawns of various types.

2. The long period during which many of these habitats have persisted without total disintegration, and throughout which many of the types of plant associated with them have persisted. It is generally true that, other things being equal, the number of plant species occupying a habitat, or an ecological niche in that habitat, depends on the length of time for which that niche or habitat has been in existence. Other things are, in practice, never equal, but it is nevertheless true that long-standing habitats frequently contain more species than similar habitats of recent origin. In the New Forest, the most important habitats for most fungi, including mushrooms, toadstools and bracket fungi, are the oak-beech woods; deciduous woodland in the New Forest, in the earlier days dominated by oak, has been present for some 8,000 years, to be joined by beech around 3,500 years ago, much earlier than elsewhere in Britain (Scagrief 1960; Barber 1973; 1981; Clarke & Barber 1987). Alder-willow carr seems to have expanded to something near its present extent between around 8,000 and 7,000 years ago (Clarke & Barber 1987), while some heathland is probably of similar antiquity, though there seems to have been much more extensive spread of heathland during the Bronze Age, some 2-3,000 years ago (Tubbs 1986). On the other hand, Scots pine, though present in early post-glacial times, became extinct, and was absent until its re-introduction by man in 1776. It is therefore not surprising that, while oak and beech have fungus floras associated with them at least as rich as those elsewhere in Britain, many of the fungi of native Scottish pinewoods are

absent from areas of Scots pine in the New Forest.

3. A limited number of fungi can overcome the natural resistance of living trees to fungal attack, and grow in the wood of living trees. When a tree dies, this natural resistance is gradually lost, and many other fungi can colonise, while those already there become much more abundant. As already mentioned, there follows a succession of different types. In the old oak, beech and oak-beech woods much fallen timber has always been left to lie, though the amount of dead wood left lying has changed with changes in woodland management practice. Much brushwood is left lying in the silvicultural inclosures but most of the large timber occurs in the old woodland where, to a great extent, trees are permitted to remain until they die of natural causes, rather than in the plantations, where trees are felled at or before maturity, and before decay sets in. In recent years, by agreement between the Forestry Commission and the Nature Conservancy Council, an agreed proportion of fallen wood is not harvested, but allowed to lie until it decays.

Although fungus records from the New Forest have been made for just over 100 years, there is no up to date list detailing the incidence and distribution of New Forest fungi. The latest list is that by Rayner (1912; 1918): this is now very outdated, and contains few species other than mushrooms, toadstools and bracket fungi. A small group of mycologists is now in the process of compiling a new list, which should provide a reference base for all concerned with the conservation of the New Forest, as well as for mycologists. The aim of this article is to outline the history of fungus recording in the Forest, to give some indication of the reasons why it is such a rich area, with many rare types, and to appeal for further unpublished records which might add to the value of the list.

HISTORY OF FUNGUS RECORDING

The first recorded fungus foray in the New Forest was held by the Rev W L W Eyre, MA, of Swarraton Rectory, in the autumn of 1887. The

noted mycologist M C Cooke took part in this foray, and in subsequent forays held annually until 1890. It appears that the first published list of New Forest fungi was compiled by Eyre (1887-95). The identity of nearly all the fungi listed was confirmed by Cooke who published illustrations and descriptions of new and interesting species in his *Illustrations of British Fungi* (Cooke 1881-1891). A catalogue of Hampshire fungi drawn up by Eyre was published in the *Victoria History of Hampshire* (Eyre 1900). This covered Hampshire as a whole, but some species are given the designation 'New Forest', and these are all to be found in the early lists compiled by Eyre.

The British Mycological Society, founded in 1896, held its first New Forest foray, which was based on Lyndhurst, in October 1899, under the leadership of Eyre and attended by the well-known mycologist Carleton Rea. The list of species identified was compiled by Eyre and Cooke (British Mycological Society 1900). In the autumn of 1903, the New Forest Natural History and Antiquarian Society, led by Saville-Kent, held two forays in the Forest. The species lists from these do not appear to have survived, but Saville-Kent initiated the production of a list of New Forest fungi. Shortly afterwards, however, he departed to Polynesia, and R W Rayner of Southampton completed the compilation. The manuscript list was completed in 1904, but it was not published until two years later (Rayner 1906) as a privately printed pamphlet, 'compiled for the New Forest Natural History and Antiquarian Society and the Bournemouth and District Society of Natural Science'. The list, whose arrangement and nomenclature were mainly according to Masee (1892-5), enumerated some 570 species, nearly all of them of the larger fungi: microfungi are represented only by a very few records.

Rayner continued his work on New Forest fungi for a number of years, and a second, much extended list of New Forest fungi and slime fungi (mycetozoa) was published in 1912 (Rayner 1912). This included 743 species and specified the exact localities where fungi recorded in the original list had been specified as 'common' or 'frequent'. It was stated that M

C Cooke, G Masee, Carleton Rea, and Arthur and Miss G Lister had been among those who had confirmed the identity of doubtful or critical species. Some additional species collected on a Hampshire Field Club foray in 1913 were subsequently recorded (Rayner 1918).

The British Mycological Society again held a foray in the New Forest, based on Lyndhurst, in 1916 (British Mycological Society 1917). The foray list included some 500 species, including 100 new to the New Forest. A D Cotton, J Ramsbottom, Carleton Rea and Miss E M Wakefield checked critical records. In subsequent years, up to 1931 Rayner was responsible for a succession of foray lists published in the *Proceedings* of the Hampshire Field Club and Archaeological Society and he also wrote a supplement to the second edition of his list (Rayner 1918). During the succeeding years, interest in New Forest fungi seems to have diminished, though the British Mycological Society held a Spring foray in the New Forest, once again based on Lyndhurst (British Mycological Society 1934). The foray list was compiled by Miss Wakefield, and included a number of new records, especially of encrusting fungi on wood (Aphylllophorales). From 1941 until 1953, Mr A A Pearson led a number of Hampshire Field Club forays into the New Forest and in 1955 F B Hora led a HFC foray in the Denny area. In 1954, the British Mycological Society Autumn foray, held at Southampton, included several visits to New Forest sites, and the foray list was compiled by F B Hora (British Mycological Society 1955). Again there was a decline of interest in the New Forest by expert mycologists, though the HFC and several local natural history societies such as the Bournemouth Natural Society led by V Pickering from 1959 to 1972, and the Southampton Natural History Society held regular forays. Lists of the fungi recorded on some of these are available; they provide additional localities for well-known species, but make few additions to the species list. During this period, N F Chadwick, of the Southampton University Botany Department made detailed records of the fungi of the Denny area (Chadwick 1955).

The year 1982 saw a marked revival in interest

in New Forest fungi. The British Mycological Society held its Autumn foray at Southampton that year, and again visited various New Forest localities (British Mycological Society 1984). The foray list was compiled by the Society's Recorder, Mr W T Moody, and all records of critical or rare species were checked by experts. A number of new species were added to the New Forest list, and these included cases where a single species proved on detailed examinations to be a mixture of two closely related species. The same year there was a public inquiry into an application to drill for oil in Denny Inclosure. The proposed location was very close to the Denny Wait area, outstandingly good for fungi and the type site for several very rare species of *Cortinarius*. Consequently, the British Mycological Society, for the first time in its history, gave evidence at a public inquiry, opposing the application. Since the inquiry was also concerned with the general principle of oil exploitation in the New Forest, the British Mycological Society submitted an unpublished list of rare and endemic fungi reported from the New Forest. This was compiled with the aid of several specialist mycologists, including D H Reid, P D Orton and R W Rayner, who contributed unpublished records, many of them of fungi not previously recorded from the area. The planning application was subsequently rejected and the Minister of the Environment stated that there was a presumption against drilling for oil within the New Forest Perambulation. In 1984 the British Mycological Society held a specialist Workshop, based at Southampton, on fungi on lichens, led by D L Hawksworth, and a further British Mycological Society Workshop, on pyrenomycetes, took place in 1988. Each added several species to the New Forest list. Work by visiting experts and local Societies continues.

THE FUNGUS FLORA

Since fungi depend nutritively on living or dead plant material, it is not surprising that the distribution of a particular species depends on the distribution of the different vegetation types, though other factors are also relevant. This

feature is best illustrated in the agarics (gill fungi and their allies), the recording of which has been quite intensive for many years. At least 750 species of Agaricales are known to occur, and up to 100 records of some of these have been located. These records provide some idea of distribution patterns, though systematic surveys have been made only in the Denny area, south-east of Lyndhurst, which includes Denny Wood, Denny Inclosure, Matley Bog and neighbouring heathlands (Chadwick 1955). In the Denny area the largest number of species occurs under or on beech, with smaller numbers associated with oak, birch or pine (which is mostly Scots pine).

damage the tree on which they grow, but aid its growth by providing a supply of minerals, even in very poor soils, in return receiving sugars for their own growth. The type of mycorrhizal fungus found in a particular place depends partly on the age of the tree, but also on the type of site; for example, the bright-red toadstool *Russula emetica* occurs widely under pine, but the well-known *Lactarius deliciosus*, an edible fungus with orange juice, is typical of damp pinewood, such as the area south of Aldridge Hill Inclosure (NGR SU 280 027). Even species growing on litter, rather than being mycorrhizal, may be specialised in their habitat. For example, the

Table 1. Numbers of species of the larger fungi from different habitats within the Denny area recorded by Chadwick (1955)

Woodland				Heathland		Bog	Dung	Total
On wood		On ground, etc.		On/by trees	Other			
Broadleaf	Conifer	Broadleaf	Conifer					
82	9	110	42	94	28	24	12	362

The total number is less than the sum of the other figures, since some species occur in more than one habitat.

The figures (Table 1) should be treated with caution, since the areas occupied by the different tree species are very different, but general observation suggests that the old beechwoods are particularly rich in fungus species. For some unknown reason, mushrooms and toadstools are more abundant on bare ground than in places where there is ground cover: the abundance of fungi under beech is probably related to the prevalence of bare ground under beech. On bare ground under beech, the bright red caps of *Russula mairei*, a gill fungus mycorrhizal on beech, usually form a fine sight in autumn, while on recently dead branches the glistening white caps of *Oudemansiella mucida* are often very beautiful. On long-dead beech wood, other species occur, such as *Mycena haematopus*, a small toadstool exuding a blood-red juice when broken. Of fungi growing under birch, mycorrhizal species such as *Leccinum scabrum* and *L. versipelle* are to be found almost anywhere birch grows: mycorrhizal fungi do not

delicate pale pink gill fungus *Mycena pura* is, in general, confined to beech litter.

Heaths and bogs, and lawns derived from them, yield far fewer species: many which are recorded as being from open heaths or bogs are in fact associated with isolated trees. However, there are some true open-ground species such as the beautiful and often brightly coloured wax caps (species of *Hygrophoraceae*), and *Omphalina* spp. on peat and among *Sphagnum*.

The effect of agarics on the vegetation is as important as that of vegetation on the agarics. As discussed in a previous paper (Manners & Edwards 1986) honey fungus (*Armillaria mellea* agg.) was an important cause of the death of old beech in the years following the very hot, dry summer of 1976.

Some seventy species of bracket fungi (polypores) have been recorded from the New Forest: of these, only ten are exclusively or mainly found on conifer wood, while the remainder occur on the wood of broad-leaved trees, with

beech being the most frequent host. Many well-known species occur repeatedly for many years on the same tree, but some of the less-known species have been recorded only once, and then in a well-worked locality where they would probably have been recorded on other occasions if fruiting. A few of the polypores are important tree pathogens, in particular species of *Ganoderma* forming woody brackets on beech, *Laetiporus sulphureus* producing bright yellow brackets on oak and *Phaeolus schweinitzii*, brown and spongy on certain conifers, such as Douglas fir.

The other larger fungi (Aphylliphorales) are less well known, and the numbers of species of these which have been recorded probably bears little relationship to the numbers actually present in the New Forest. However, certain features do emerge from the rather patchy records. Species of *Tomentella* are well represented and the New Forest has provided the type specimen of several species named by Miss Wakefield. The Hedgehog fungi (Hydnaceae) appear less well represented, many of the species of native Scottish pinewoods apparently being absent, though some striking and rare or uncommon species found on hardwoods do occur, notably *Hericium erinaceum*, which occurs growing from broken limb bases of dead or dying beech. It will fructify annually for many years on a particular tree without spreading, and will be lost to that area if that tree is removed.

Among the Ascomycotina, both the disc fungi (discomycetes) and the flask fungi (pyrenomycetes) are well represented. Some work on both groups has been done by specialists, but much remains to be done, and the numbers of species recorded probably greatly underestimates the numbers present. For example, a few years ago *Lachnellula pseudofarinacea*, a discomycete on poorly growing Scots pine, previously recorded in Britain only from the Scottish highlands, proved to be quite common in some parts of the New Forest when a survey of local species of this genus growing on conifers was carried out. *Poronia punctata* is a pyrenomycete which was formerly common in Britain on horse dung, but

which has become much more uncommon in this country in recent years. However, it has recently been recorded from several New Forest localities, often in some abundance, invariably on horse dung.

The microfungi of the New Forest have been little studied, and few records have been made. Many of them are confined to specific species and most New Forest habitats are species-poor, containing less than fifty species of flowering plants in any one locality (Tubbs 1986). In particular, the numbers of rust, smut, powdery mildew and downy mildew species appear to be small; for example only twenty rust species have been recorded, out of the 300 British species. The study of the New Forest slime fungi is in its infancy, but preliminary studies suggest that a good number of species occur, mostly on the bark of fallen trees.

It was becoming clear in 1985 that a new list of New Forest fungi was long overdue, and it was decided to initiate the compilation of a computer database of such fungi, to provide a continuously updated record in such a form that records of a particular species and list relating to specific localities could readily be provided. Mr Gordon Dickson has undertaken the task of compiling such a database, with the aid of Dr J G Manners and other mycologists. The incorporation of published and other readily accessible records is well in hand, and so far around 2000 species have been listed but it is felt that there are still probably many useful unpublished records which have not yet been located. Further contributions would be welcome, and should be sent to Dr J G Manners, Department of Biology, Building 44, The University, Southampton SO9 5NH. Where possible, each record will include name of fungus collector and identifier, locality and date of collection, substrate, and location of specimen, if preserved. In case of critical species, details such as spore measurements should be included. Records of common and well-known fungi are also welcome, as our knowledge of their distribution is certainly incomplete.

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