

## LUNDY FUNGI: FURTHER SURVEYS 2004-2008

by

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### ABSTRACT

The results of four five-day field surveys of fungi carried out yearly on Lundy from 2004-08 are reported and the results compared with the previous survey by ourselves in 2003 and to records made prior to 2003 by members of the LFS. 240 taxa were identified of which 159 appear to be new records for the island. Seasonal distribution, habitat and resource preferences are discussed.

*Keywords: Fungi, ecology, biodiversity, conservation, grassland*

### INTRODUCTION

Hedger & George (2004) published a list of 108 taxa of fungi found on Lundy during a five-day survey carried out in October 2003. They also included in this paper the records of 95 species of fungi made from 1970 onwards, mostly abstracted from the Annual Reports of the Lundy Field Society, and found that their own survey had added 70 additional records, giving a total of 156 taxa. They concluded that further surveys would undoubtedly add to the database, especially since the autumn of 2003 had been exceptionally dry, and as a consequence the fruiting of the larger fleshy fungi on Lundy, especially the grassland species, had been very poor, resulting in under-recording.

Further five-day surveys were therefore carried out each year from 2004-08, three in the autumn, 8-12 November 2004, 4-9 November 2007, 3-11 November 2008, one in winter, 23-27 January 2006 and one in spring, 9-16 April 2005. The preliminary results are presented here. As discussed in our previous accounts of the fungi on Lundy (Hedger & George, 2004; Hedger *et al.*, 2007) the results must be viewed as giving only a partial picture of the status of fungi on Lundy, firstly because of the briefness of the visits in each year, and the fact that fruiting bodies, which have unpredictable weather-dependent fruiting timing, were the basis of the surveys. Assessment of seasonal and habitat distribution of species of fungi by fruit bodies should always be regarded as an approximation of the distribution of the mycelia which formed them (Feest, 1999). However, it remains the only practical approach and the surveys reported here have yielded useful information about the fungi on Lundy that will provide a basis for our future studies.

## **METHODS**

### **Field Surveys**

The field surveys used the method outlined in Hedger & George (2004) and involved collecting and photographing fungi along different routes over the island each day, followed by detailed examination of the fresh material in the evenings using a microscope and then overnight drying of voucher specimens in envelopes for storage in a mycological herbarium held in the University of Westminster. Each fungus sample was given a collection number, the site identified by GPS to a 10-figure grid reference and, where possible, the fungus was photographed in its natural environment. The habitat was noted and in the database broadly classified into short turf, tall grassland, wet grassland with *Molinia caerulea* and rushes, *Calluna* heath, tall Bracken and woodland, the latter including Blackthorn, *Rhododendron* and Gorse thickets. The substratum on which the fungus was fruiting/ growing was also recorded and classified e.g on soil, in grass, on herbivore dung, on dead wood, on leaf litter. The life strategies of the fungi were assessed as saprotrophic - clearly associated with decomposition of dung, litter or wood; parasitic - growing on living plants as pathogens; or mycorrhizal - associated with living roots of shrubs and trees.

As part of the November 2004 survey a more detailed examination of fruit body distribution of grassland species of macrofungi was carried out on 10 November within a 180 x 60 m quadrat (10800m<sup>2</sup>) laid out in the grassland bounded by the stones marking the edges of the south-western end of the Airfield. Line transects at 2 m intervals were then walked and the position of each fruit body recorded using a Trimble ProXR GPS system with accuracy down to 50cm and data entered on a laptop as Excel files. In addition a 50 x 50 m quadrat was laid out in Middle Park near the Mangonel Battery and divided into line transects laid out at 2 m intervals which were walked and fruit bodies recorded. Surveys were repeated at both sites in 2007 and 2008 by walking along similar line transects but without Trimble ProXR GPS positioning.

### **Identification of Taxa**

The identification of the taxa of fungi remains tentative in some cases, and may require revision once the voucher material has been examined by specialists.

## **RESULTS**

### **Field Survey**

The summarised results for the five surveys, November 2004, April 2005, January 2006, November 2007, November 2008 are given in the Table in the Appendix (page 36). The first column shows the taxa recorded, an asterisk indicating a species not recorded in the 2003 survey, or by the previous surveys summarized in Hedger & George (2004). The taxa have been divided up into groupings in an artificial 'field-orientated' manner, into 'microfungi' and 'macrofungi', on the basis of the size of the fruit bodies. In addition, popular, but not natural, names for some of the divisions and orders of fungi are used, rather than the more complex 'natural' groupings accepted in current treatments of UK

fungal biodiversity (see [www.fieldmycology.net/FRDBI/FRDBI.asp](http://www.fieldmycology.net/FRDBI/FRDBI.asp)), for example the 'Aphylophorales' (Bracket fungi). These terms are used in many of the current popular fungal field guides (e.g. Phillips, 2006). This approach was employed in the 2003 survey (Hedger & George, 2004), and has the advantage of making comparisons easier. In addition, records of fruiting bodies of the Myxomycetes, (Slime Fungi) are included in the Table, although these organisms are not true fungi (Ing, 1999). Fungal taxonomy is in a constant state of flux. It will be necessary in the future to revise past records from Lundy (Hedger & George, 2004) and those presented in this paper, to incorporate current interpretations of taxa, e.g. Legon & Henrici (2005) for the Basidiomycota. The sources for the names used in the Table are as follows: Microfungi: Ellis & Ellis (1997), Macrofungi: Ascomycota, Breitenbach & Kranzlin (1981), Jordan (1988), Ellis & Ellis (1997), Spooner & Nauta (1997); Clavariaceae, Henrici (1997), Phillips (2006); Polyporaceae, Breitenbach & Kranzlin (1986), Jordan (1988); Agaricales, Moser (1983) with updates from Courtecuisse & Duhem (1995), Phillips (2006); Gasteromycetales, Jordan (1988), Breitenbach & Kranzlin (1986); Heterobasidiomycetales, Breitenbach & Kranzlin (1986), Phillips (2006); Myxomycetes, (Ing, 1999).

The Collection number in the Table refers to the voucher specimen, and the following column the site where this collection was made (the notation nc means no collection was made). Records of the fungi from the five surveys are noted in the last five columns of the Table. In the case of fungi recorded on more than one survey the substrate/host, the Collection number and site refer only to the first collection. Details of the later records are omitted in order to reduce the complexity of the Table.

### Seasonality of Records

The five surveys recorded a total of 240 taxa, of which 159 were new records for Lundy compared to Hedger & George (2004), who published records of 156 taxa, giving a current total for Lundy of 315. This is a lower total than the estimate of 358 given by Hedger *et al.* (2007), the reduction being due to revision of species identifications. Predictably some of the new records were of microfungi (37), easily overlooked by the non-specialist in brief visits to the island, but most were new records of macrofungi, including some common taxa of large size, such as the agaric *Macrolepiota rhacodes* (Shaggy Parasol Mushroom), recorded near the Castle in 2004, emphasizing the under-recorded status of the Lundy mycoflora. The Table shows that the timing of the collecting visit had an effect on the distribution of the records. The three November visits (2004, 2007, 2008) produced many records of macrofungi, especially agarics, which fruit in the late summer/autumn. However, the records for the visit in January 2006 also included many of these fungi, for example six species of Waxcaps (*Hygrocybe*), possibly because the mild oceanic climate and higher winter soil temperatures on Lundy allowed these 'autumn' fungi to continue fruiting, although the abundance of fruit bodies and numbers of species was much lower than in November. One well-known 'winter' agaric was found on this visit, *Flammulina velutipes*, the frost resistant 'Winter Mushroom', on dead Gorse behind the Brambles cottages.

In contrast, in Spring (April 2005), only seven agaric species were recorded in total, most of them common grassland species such as *Coprinus plicatilis*, *Conocybe subovalis* and

*Panaeolus foenisecii* which probably only stop fruiting on Lundy during summer droughts. No truly spring-fruiting agarics were found, but are to be expected, for example the large and conspicuous *Calocybe gambosa* (St George's Mushroom) that fruits in late April/May and was recorded from the New Barn by Montagu (1973). The low number of macrofungi recorded was probably caused by the dry conditions in April 2005. An examination of the Table shows that the majority of macrofungi recorded during the April 2005 survey had hard or persistent fruit bodies, mostly wood decomposers such as *Phellinus ferrugineus* (**Plate 1a**), *Hymenochaete corrugata*, *Daldinea concentrica* *Xylaria hypoxylon* (**Plate 1b**) and *X. polymorpha*. New records from April 2005 included pathogenic microfungi on plants. Some of the eight species of Rusts (Uredinales) recorded sporulate on their hosts in the spring, for example the bright yellow aecidia of *Puccinia caricina* (**Plate 1c**) on leaves of the Nettle, (*Urtica dioica*) and the dark teliosori of *Uromyces muscari* on leaves of the Bluebell (*Hyacinthoides non-scripta*). Another example is the Anther Smut (*Ustilago violacea*), surprisingly unrecorded before 2004, but finally found on flowers of the Red Campion (*Silene dioica*) in Millcombe Valley on a day visit in May 2005 and was even more abundant in the same location in June 2009 (Hedger, unpublished data). Also in Millcombe, the yellow spots caused by *Ramularia ari* (**Plate 1d**) were common on the leaves of Lords-and-Ladies (*Arum maculatum*).

The Table also shows a preponderance of records of saprotrophic microfungi and the smaller macrofungi in the discomycetes and pyrenomycetes for April 2005 and January 2006. This may be an artifact related to collecting effort, rather than seasonality, since the absence of macrofungi meant that attention could be paid to likely locations for these minute fungi, using Ellis & Ellis (1997) to confirm identities. However, winter and spring would be times when the water content of the litter would be high enough to allow these fungi to sporulate, for example the delicate white cups of the discomycete *Dasyscyphus virgineus* (**Plate 1e**) on the litter of Heather (*Calluna vulgaris*). A good example of a rich habitat for these litter decomposer fungi is the Soft Rush (*Juncus effusus*) whose clumps were especially productive in April 2005 and January 2006, with records of the minute but beautiful *Unguicularia costata*, *Myriosclerotinia curreyana*, *Mollisea juncina*, *Dasyscyphus apalus*, *Dasyscyphus rehmi* (discomycetes), *Leptosphaeria juncini* (pyrenomycetes) *Stagonospora innumerosa*, *Conoplea fusca* and *Cercospora juncini* (hyphomycetes).

### **Habitat and Resource Preferences**

Hedger & George (2004) and Hedger *et al.* (2007) reviewed the habitat and resource preferences of fungi on Lundy. There is only a very small area of the island with tree cover, comprising Millcombe Valley and tiny pockets of trees along the East Sideland up to the Quarries (Hubbard, 1971). The major habitat is grassland and heath, although the plant communities vary considerably in species composition between the east and West Sideland, the plateau north and south, the farm and marshy areas such as Pondsburry, each of which has a distinct species assemblage of fungi (Hedger *et al.*, 2007). The present results confirm this picture but have expanded the numbers of taxa recorded for each plant community.

## Woodland

Fungi found in woodland are likely to be either mycorrhizal partners of the trees or leaf litter and wood decomposers. Some wood decomposers have been recorded at the same site since the Lundy fungus survey began and will persist until the tree or stump has been completely decomposed, for example *Phellinus ferrugineus* (**Plate 1a**) on the *Rhododendron* stumps near The Ugly and *Xylaria hypoxylon* (**Plate 1b**) on the pile of Ash logs near the Walled Garden in Millcombe Valley. The Table does however show that the number of decomposer fungi recorded has been increased considerably by the surveys, mostly species of Polyporaceae, including some unusual records. *Asterostroma medium* (**Plate 2a**), a rare resupinate fungus containing stellate setae was found on decaying Turkey Oak (*Quercus cerris*) branches in Quarter Wall Copse in November 2008. The strikingly orange and uncommon *Hymenochaete cinnamomea* (**Plate 2b**) was recorded from *Rhododendron* stumps near The Ugly also in November 2008. It will be interesting to see if the temporary increase in woody resources for decomposers afforded by the *Rhododendron* clearances over the next few years will further increase the biodiversity of lignicolous fungi. Unusual hosts for some lignicolous fungi on Lundy were noted by Hedger & George (2004) for a number of species, for example *Phellinus tuberosus* on Gorse (*Ulex europaea*). Further evidence for this trend is the Porcelain fungus *Oudemansiella mucida*, (**Plate 2d**), recorded on branches of the Beech (*Fagus sylvaticus*) in Quarter Wall Copse in November 2007, but noted during the November 2008 survey to have spread into an adjacent Turkey Oak.

Hedger & George (2004) and Hedger *et al.* (2007) postulated that future surveys would increase the number of records of mycorrhizal species of fungi from the wooded areas, especially in the agaric families Russulaceae and Cortinariaceae and in the orders Boletales and Sclerodermatales. So far this has not happened, with the exception of two more species of *Russula*, *R. cyanoxantha* (**Plate 2c**) and *R. foetens* recorded in November 2008 under Holm Oak (*Quercus ilex*) in Millcombe Valley (Appendix). Either Lundy is depauperate in these fungi or they are fruiting earlier, in July-September, and so were absent during the surveys.

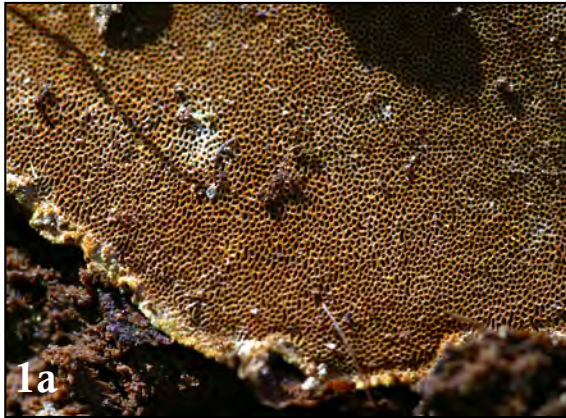
## Grassland and Heath

Hedger *et al.* (2007) followed Hubbard (1997) in dividing this habitat into four types: 1) Short Turf Grassland, maintained by intensive grazing (e.g. Middle Park, Acklands Moor, Southwest Field, the Airfield, Castle Hill); 2) Tall Grassland with *Molinia caerulea*, *Juncus effusus* and Bracken (*Pteridium aquilinum*) (e.g. the area between Quarter Wall and Halfway Wall); 3) fenced-off improved grassland around the farm; 4) *Calluna vulgaris*-dominated heath north of Threequarter Wall. Hedger & George (2004) pointed out that the fungi in these habitats are either directly associated with the plants as pathogens, decomposers and mycorrhizal partners, or are coprophilous species, growing on dung, for example *Coprobria granulata* (**Plate 1f**), whose bright orange apothecia are common on the dung of Sheep, Pony and Sika Deer throughout the island.

### Short Turf Grassland

The most diverse community of fungi on Lundy is associated with the unimproved short turf grassland and the data presented in the Table in the Appendix show that the number of species recorded from this habitat has been increased considerably by the surveys.

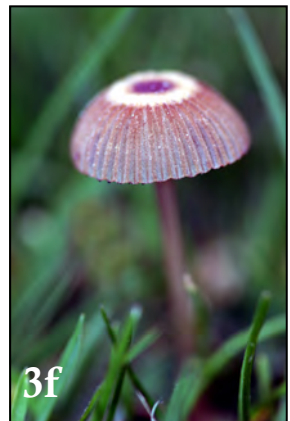
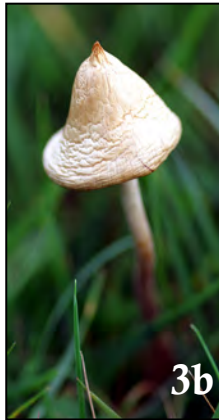
**Plate 1:** **1a** *Phellinus ferrugineus* (Orange Pore Crust),  $\times 1$ , fb on *Rhododendron* stump, The Ugly; **1b** *Xylaria hypoxylon* (Candle Snuff Fungus),  $\times 2.5$ , fb on *Fraxinus excelsior* (Ash) log, Millcombe Valley; **1c** *Puccinia caricina* (Nettle Rust),  $\times 2$ , aecidia on *Urtica dioica* (Nettle), The Quarries; **1d** *Ramularia ari*,  $\times 2.5$ , causing necrotic patches on leaves of *Arum maculatum* (Cuckoo Pint), Millcombe Valley; **1e** *Dasyscyphus virgineus*,  $\times 3$ , apothecia on dead *Calluna vulgaris* (Heather) stems, The Quarries; **1f** *Coprobria granulata*,  $\times 2$ , apothecia on Sheep dung, The Airfield. (fb=fruit body)



**Plate 2:** **2a** *Asterostroma medium*, ×1, fb on fallen branch of *Quercus cerris* (Turkey Oak), Quarter Wall Copse; **2b** *Hymenochaete cinnamomea*, ×1, fb on *Rhododendron* stump, The Ugly; **2c** *Russula cyanoxantha* (Charcoal Burner), ×1, fb under *Quercus ilex* (Holm Oak), Millcombe Valley; **2d** *Oudemansiella mucida* (Porcelain Agaric), ×2, fbs on dead branch of *Quercus cerris* (Turkey Oak), Quarter Wall Copse; **2e** *Hygrocybe virginea* var. *fuscescens* (Snowy Waxcap), ×1.5, underside of fb in grass, Golden Well; **2f** *Hygrocybe virginea*, var unknown-closest to *fuscescens*, ×1.5, underside of fb in grass, Golden Well; **2g** *Hygrocybe psittacina* (Parrot Waxcap), ×2, fb in short turf, The Hospital. (fb=fruit body)



**Plate 3:** **3a** *Hygrocybe punicea* (Crimson Waxcap),  $\times 0.5$ , fbs in long grass, The Airfield; **3b** *Psilocybe semilanceata*, (Liberty Cap),  $\times 2$ , fbs in short turf, Lighthouse Field; **3c** *Clavulinopsis corniculata* (Meadow Coral),  $\times 2$ , fbs in short turf near Quarter Wall Cottages; **3d** *Clavulinopsis helvola* (Golden Spindles),  $\times 2.5$ , fbs in short turf at side of central path above Gannets' Combe; **3e** *Geoglossum umbratile* (Earth Tongue),  $\times 2$ , fbs in short turf, west end of Quarter Wall; **3f** *Coprinus plicatilis* (Pleated Inkcap),  $\times 2.5$ , fb in long turf, Croquet Lawn below Tavern; **3g** *Hygrocybe chlorophana* (Yellow Waxcap),  $\times 1.5$ , fbs in long grass, East Coast path near Brazen Ward; **3h** *Entoloma turci*, fbs  $\times 0.75$ , in tall grass above Benjamin's Chair. (fb=fruit body)





**Plate 4:** **4a** *Russula* cf. *nana*,  $\times 0.75$ , fb under *Molinia caerulea*/Bog Myrtle (*Myrica gale*) at side of Central Path N. of Quarter Wall; **4b** *Lactarius* cf. *lacunarum*,  $\times 1$ , fb under *Molinia caerulea*/Bog Myrtle (*Myrica gale*) at side of central path N. of Quarter Wall; **4c** *Cortinarius* cf. *phaeopygmaeus*,  $\times 3$ , fbs in short turf/Thyme (*Thymus communis*), Quarter Wall Cottages; **4d** *Hygrocybe* cf. *lacmus*,  $\times 1.5$ , fbs on bare peat in short Heather (*Calluna vulgaris*), near John O’Groats House; **4e** *Clavaria argillacea* (Moor Club),  $\times 3$ , fbs on bare peat in short Heather (*Calluna vulgaris*), near John O’Groats House; **4f** *Galerina laevis*,  $\times 3$ , fbs in *Leucobryum* moss/bare peat in *Rhododendron* clearance site, The Ugly. (fb=fruit body)

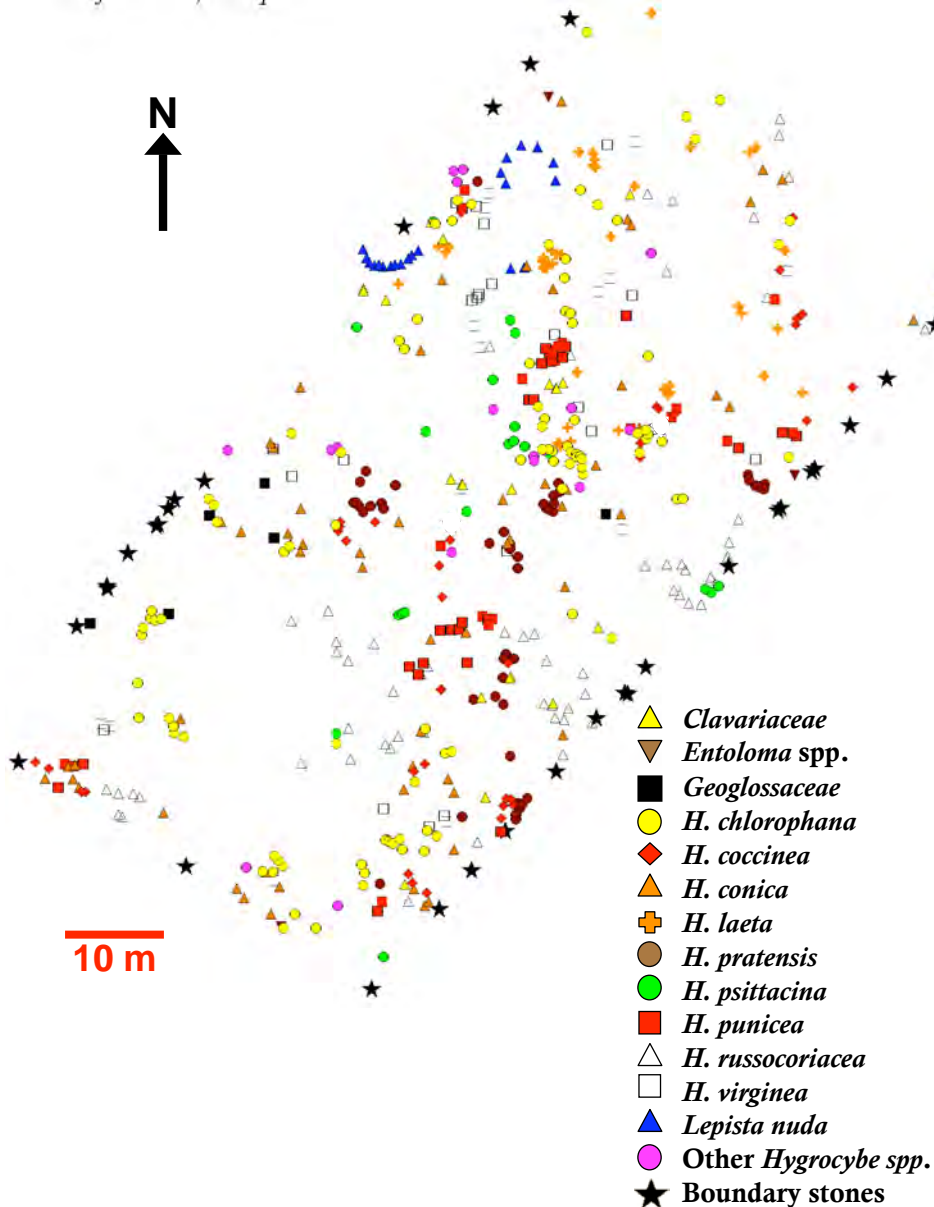


Recent published work (Griffith *et al.*, 2002, 2004, 2006; Griffith & Roderick, 2007; Newton *et al.*, 2003) has emphasised the importance of the diversity of species of higher fungi as indicators of grassland habitat quality. These ‘indicator species’ include members of the agaric genera *Entoloma*, (Pink Gills) for example *E.turci* (**Plate 3h**) and *Hygrocybe*, (Waxcaps) for example *H. punicea* (**Plate 3a**), *H. chlorophana* (**Plate 3g**), *H. psittacina* (**Plate 2g**), *H. virginea* var *fuscescens* (**Plates 2e and f**). Other indicator fungi include species in the genus *Clavulinopsis* (family Clavariaceae, Coral Fungi or Fairy Clubs), for example *Clavulinopsis helvola* (**Plate 3d**), *C. corniculata* (**Plate 3c**) and the genera *Geoglossum*, *Trichoglossum* and *Microglossum* (Family Geoglossaceae, Earth Tongues), for example *Geoglossum umbratile* (**Plate 3e**). Sites in the UK have been ranked according to scores based on the numbers of these indicator species, the CHEGD system (**Clavariaceae, Hygrocybe, Geoglossaceae, Entoloma, Dermoloma**) described in Rotheroe *et al.* (1996, 2001), Griffith *et al.* (2004). Hedger & George (2004) in reporting the results of the first detailed survey of fungi on Lundy in November 2003, paradoxically listed very few of these indicator species, but this was due to the exceptionally dry autumn that year. The surveys in wetter Novembers in 2004, 2007, 2008 (Appendix) have generated an ‘indicator species’ total of 5 for Clavariaceae (all *Clavulinopsis* species, excluding *Clavaria argillacea*, associated with *Calluna* heath), 22 for *Hygrocybe* (including the three varieties of *H. virginea*, but excluding *H.cf. lacmus* which is associated with *Calluna* heath), 8 for *Entoloma*, 5 for Geoglossaceae, (3 for *Geoglossum* and 1 each for *Trichoglossum* and *Microglossum*), 1 for *Dermoloma*. The record of *Microglossum viride* (Green Earth Tongue) in 2004 from the Airfield is of special interest since this is an important ‘indicator species’ on the CHEGD system (Griffith *et al.*, 2004). Hedger *et al.* (2007) and Haw (2009) emphasized that these findings confirm the national conservation status of Lundy grassland.

During the survey carried out in November 2004 a more detailed study of the fungi associated with short turf was carried out on a 180 x 60 m quadrat (10,800 m<sup>2</sup>) on the Airfield using a GPS system to measure the positions of fruit bodies (see Methods). The results are shown in Figure 1 and Table 1. A total of 1264 fruit bodies were recorded (0.11 per m<sup>2</sup>). The abundance of the fruiting of ‘indicator taxa’ is clear: 14 species of *Hygrocybe*, 1 species of *Entoloma*, 1 species of *Dermoloma*, 4 species of Clavariaceae and 2 species of Geoglossaceae were recorded. In addition two prominent rings of fruit bodies of the Wood Blewit (*Lepista nuda*) were mapped in the north corner (see Figure 1). A resurvey was carried out by walking line transects across the site (see Methods) in November 2007 and 2008. Although the airfield had obviously been mowed regularly, the grass height had increased considerably by 2007 and by 2008 it was covered by deep matted turf. Only a few of the ‘indicator species’ present in 2004 were found, and all in very low numbers (*Hygrocybe virginea* var. *virginea*, *H. psittacina* in 2007; *H. punicea*, *H. russocoriacea* in 2008). There were no *Lepista nuda* at the sites of the rings recorded in 2004. Most of the agarics found were *Panaeolus* spp., *Psilocybe semilanceata* (Liberty Cap **Plate 3b**), *Agaricus arvensis*, and *Stropharia aeruginosa*, all coprophilous or characteristic of dung-enriched soil and all of which were present in the 2004 survey, but not mapped. Middle Park east of the Mangonel Battery was also surveyed by line transects in 2004 and was found to be almost as diverse for *Hygrocybe* and Clavariaceae species as the Airfield. Resurveys at the same site by line transects in 2007 and 2008 found no ‘indicator species’.

**Figure 1:** Map of positions of fruit bodies determined by a GPS survey of grassland species of macrofungi in a 180x 60 m quadrat on the Airfield, 10th November 2004

Details of the survey are given in the methods section of the paper. Accuracy was to 50cm. Only positions of species recorded as four or more fruit bodies in the survey are included. For the full data set see Table 1. In the key H. represents the genus *Hygrocybe* (Wax Caps). Where taxa were recorded at a lower frequency (1-3 fruit bodies) they are shown at family or generic level, viz 'Clavariaceae', where four species were found *Clavaria fumosa*, *Clavulinopsis corniculata*, *C. fusiformis*, *C. helvola*; 'Geoglossaceae', where three species were found *Geoglossum glutinosum*, *Trichoglossum hirsutum*, *Microglossum olivaceum*; 'other *Hygrocybe* spp.' were *H. ceracea*, *H. flavipes*, *H. insipida*, *H. quieta*, *H. reidii*; *Entoloma* spp. were *E. conferendum*, *E. asprellum*.



**Table 1:** Number of fruit bodies of macrofungi recorded from a 180 x 60m quadrat on the Airfield, 10 November 2004

Species	Number of fruit bodies
<i>Hygrocybe ceracea</i>	38
<i>H. chlorophana</i>	244
<i>H. coccinea</i>	133
<i>H. conica</i>	111
<i>H. flavipes</i>	3
<i>H. insipida</i>	3
<i>H. laeta</i>	210
<i>H. pratensis</i>	111
<i>H. psittacina</i>	36
<i>H. punicea</i>	96
<i>H. quieta</i>	1
<i>H. reidi</i>	2
<i>H. russocoriacea</i>	154
<i>H. virginea</i>	66
<i>Clavulinopsis corniculata</i>	10
<i>Clavulinopsis fusiformis</i>	9
<i>Clavulinopsis helvola</i>	5
<i>Clavulinopsis fumosa</i>	4
<i>Geoglossum glutinosum</i>	2
<i>Trichoglossum hirsutum</i>	3
<i>Microglossum olivaceum</i>	1
<i>Entoloma conferendum</i>	2
<i>Dermoloma</i> sp.	1
<i>Lepista nuda</i>	19
<b>Total number of fruit bodies</b>	<b>1264</b>
<b>Number per m<sup>2</sup></b>	<b>0.11</b>

The apparent loss of 'indicator species' diversity in these sites is probably related to the reduction in rabbit grazing caused by the Myxomatosis outbreak in 2006. Both the Airfield, Middle Park, and other previously short turf areas of the island such as the South Field had by 2007 changed to tall rank grass. In contrast, in both November 2007 and 2008, areas of the island that continued to be grazed down to short turf still had a high diversity of 'indicator species'. An example was the pony-grazed area at the back of Quarter Wall Cottages and around the Hospital where eight species of *Hygrocybe*, (*H. chlorophana*, *H. coccinea*, *H. ceracea*, *H. conica*, *H. insipida*, *H. persistens*, *H. russocoriacea*, and *H. pratensis*) and three species of Clavariaceae (*Clavulinopsis helvola*, *C. fusiformis*, *C. corniculata*) were recorded in November 2007, and almost the same number in 2008. Other similar 'hot spots' of grazed turf in 2008 were the west end of Quarter Wall and around the end of the central path above the North Light where *Geoglossum* species and *Trichoglossum hirsutum* were recorded. In addition, sections of the path along the west side and south end of the island where turf height is reduced by footfall also produced fruit bodies of *Hygrocybe* and *Entoloma* species, especially *H. insipida*, *H. chlorophana* and *H. russocoriacea* and *Entoloma turci* (**Plate 3h**), *E. conferendum* - the latter species seemed to be the 'indicator taxon' least affected by grass height and was the only *Entoloma* species common in the tall grass areas in the 2007 and 2008 surveys.

The explanation of these changes may simply be that the mats of tall vegetation now built up over many previous rabbit-grazed short turf areas inhibit fruiting of the fungi, either by reducing light penetration, which is needed to initiate sporulation in some higher fungi (Stamets & Chilton, 1983), or that the higher and more constant humidity at soil level has a similar effect. Many of the short turf species which have small fruit bodies may simply be hidden in the turf mat, for example agarics such as *Mycena aetites*, *Mycenella bryophila*, *Rickenella fibula* and *Coprinus plicatilis* (**Plate 3f**). A more worrying hypothesis is that the changes of grazing are directly affecting the mycelia of these fungi in the soil, either by altering nutrient status or by changing in the plant diversity and with it the fungal diversity.

### Tall Grassland

The 2004 list of fungi from this habitat was extended by the surveys. Most of the macrofungi continued to be a limited range of decomposer species characteristic of acid litter under Bracken and *Molinia*, for example species of *Mycena* and the False Chanterelle (*Hygrophoropsis aurantiacus*), but a number of interesting species of *Collybia* and *Clitocybe* were added (see Appendix), the largest being *Clitocybe nebularis* (3-8 cm diameter cap), a woodland species in most of Britain, found growing in 2-3 m diameter rings in matted Rushes and Bracken, abundant in 2004, but not seen in subsequent surveys.

Unexpected records from this habitat included genera of agarics usually assumed to be mycorrhizal (symbiotic) with tree roots. In 2007 a species of *Russula*, initially identified as *R. cf. queletii*, but now assigned to the arctic-alpine species *R. nana*, described in Gulden *et al.* (1985) and a species of *Lactarius*, *L. cf. lacunarum*, a species associated with alder and birch bogs (Moser, 1983), were both found close together at the side of the Central Path near Pondsbury (**Plates 4a and b**). The only woody plant in the vicinity was Bog Myrtle (*Myrica gale*), so it is possible that this was their mycorrhizal partner. *M. gale* is known to have 'actinorhiza' in its roots, an association with bacteria rather than fungi (John Raven personal communication, 2008) but he opines that it is possible that it may have fungal partners too. Alternatively there may have been Willow in the area, though an immediate search found none. In 2004 another mycorrhizal agaric *Cortinarius* (sect *Telamonina*) was found near Quarter Wall Gate associated with Dwarf Willow (*Salix repens*) (Appendix). In 2008 a very small *Cortinarius*, provisionally identified as *C. phaeopygmaeus* (**Plate 4c**) was found growing in clumps of Thyme (*Thymus communis*) near Quarter Wall Cottages although no Willow could be found nearby. *C. phaeopygmaeus* and other similar small *Cortinarius* species are usually mycorrhizal with Dwarf Willows (Gulden & Jensen, 1988). There is also published evidence of association of mycorrhizal macrofungi with herbaceous plants like Thyme, for example from the mycological surveys of the Burren by Harrington (2003).

### **Heath**

The *Calluna* - dominated North End of Lundy has continued to produce interesting records that differ from those from the rest of the island. The grey-coloured *Hygrocybe* species first recorded in the November 2004 survey as *H. radiata* (Hedger *et al.* 2007) was again recorded growing out of the bare peat in this area in November 2007 and 2008

**(Plate 4d)**, although not in January 2006. The distribution of this fungus on Lundy is different to all the other *Hygrocybe* species and it seems to be exclusively associated with pure stands of *Calluna* on thin peat over rock at the North End, especially around John O’Groats House, although in 2008 it was found as far south as a line stretching from east to west from Gannets’ Combe across the island. In situations in this area where *Calluna* was mixed with *Molinia*, Bracken and the grass *Festuca*, usually on deeper wetter peat, the fungus was not found, nor was it found with *Calluna* on other parts of the island which appear similar to the stands around John O’Groats House, for example above the Devil’s Limekiln at the South End. The identity of the fungus has yet to be established, although it appears to be closer to the description in Boertmann (1995) of *H. lacmus* than to the original identification of *H. radiata*.

Two other fungi which were recorded in the 2008 survey also developed from bare peat under *Calluna* alongside *H. cf. lacmus*. These were *Clavaria argillacea* **(Plate 4e)**, recorded near John O’Groats House in November 2008, together with the small orange agaric (*Galerina laevis*), although the latter was also common on the moss covered peat in the cleared *Rhododendron* areas on the East Sideland, **(Plate 4f, Appendix)**.

## DISCUSSION

The surveys reported in this paper have extended the numbers of species of fungi recorded from Lundy, and the current list of around 315 taxa will continue to expand as future surveys are carried out by us, hopefully over longer time periods for each visit. Undoubtedly the timing of the surveys discussed here, with only the month of November replicated over several years biases the results. Surveys in July through to October will identify a different range of fungi. Obvious and large mycorrhizal members of the Boletales, for example the Cep (*Boletus edulis*), and Agaricales such as the Fly Agaric (*Amanita muscaria*) common on mainland UK, but at present missing from the data base, probably fruit in Millcombe Valley and the East coast copses given sufficient rain, and await recording. Likewise there are a number of ‘indicator’ grassland species regularly found in surveys of unimproved grassland on the mainland which fruit in the summer and early autumn (Griffith *et al.*, 2004), but which have yet to be found on Lundy, for example the beautiful Violet Coral (*Clavaria zollingeri*) and a number of *Entoloma* and *Hygrocybe* species, such as the striking Pink Waxcap (*Hygrocybe calyptriformis*), recorded once only on Lundy, before 1970, by Arthur Strick (Walker & Langham, 1970), but surely still there.

The surveys have also brought to notice some interesting ecological problems. The status of the *Hygrocybe cf. lacmus* with *Calluna vulgaris* at the North End requires more study: 1) in order to confirm (or reject) its current provisional identification; 2) to investigate further its relationship with the *Calluna* and 3) to survey its distribution on the island more carefully to discover why it is so restricted.

The puzzling records of basidiomycete mycorrhizal fungi recorded in the grassland, possibly associated with *Myrica gale*, *Salix herbacea* and perhaps *Thymus communis* are also of great interest. There may be similarities to communities of fungi associated with Dwarf Willow and other shrubs and herbs in arctic/montane sites in Europe, for example in Norway (Gulden *et al.*, 1985; Gulden & Jenssen, 1988, Senn Erlet *et al.*,

1990), and on the Burren in West Ireland (Harrington, 2003). The exposed and poorly drained environment on parts of the Lundy plateau has similarities to these habitats. More detailed mycological surveys, especially of the areas around Pondsbury, may provide yet more examples of such mycological arctic-alpine connections.

Finally, the data presented in this paper has shown that there has been a reduction in abundance and diversity of fruit bodies of macrofungi characteristic of the short turf areas on Lundy, if the November 2004 survey is used as a baseline. This decline is clearly connected to the crash in the population of rabbits in 2006 and the replacement of the short rabbit - grazed turf with long grass over many areas. The greatest reduction has been in 'indicator species' especially in the genus *Hygrocybe*, although most are still fruiting in the small areas where short turf is maintained, for example by Pony grazing. However previously large and obvious common fungi have also declined. These include the fairy ring - forming species such as *Lepista nuda* (Wood Blewitt) and *Marasmius oreades* (Fairy Ring Fungus), both of which fruit best in a short turf habitat. Even *Macrolepiota procera* (Parasol Mushroom) and *Agaricus campestris* (Field Mushroom) are now hard to find in the area south of the Lundy Old Light where they were previously abundant (Hedger, unpublished data 2009). Recent analysis of the impact of rabbits and other grazers on Lundy vegetation by Smith & Compton (2008) emphasised that rabbit grazing is important for retaining plant diversity on Lundy, by maintaining a close cropped turf in which rare plants which are sensitive to competition, such as *Ophioglossum azoricum*, (Small Adder's Tongue Fern) are able to succeed. These species must now be under severe pressure from the dense mats of grass covering much of the previous short turf areas on the island, as may be the grassland fungi which are also dependent on this habitat, for example *Microglossum viride* (Green Earth Tongue), a UK rarity (Ing, 1992), recorded from the Airfield in 2004 but not seen since the Myxomatosis outbreak. Whether the loss is permanent or, as discussed in this paper, only a reduction in fruiting caused by the matted grass, will only be clear from the outcome of our future surveys. As pointed out by Smith & Compton (2008), the rabbit population should eventually recover, and, with it, large areas of short - cropped turf should return, in which these fungi will, hopefully, fruit again.

#### **ACKNOWLEDGEMENTS**

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**APPENDIX 1: Summarised results for five field surveys of Fungi on Lundy  
(November 2004, April 2005, January 2006, November 2007, November 2008)**

The first column shows the taxa recorded, an asterisk indicating a species of fungus not recorded in the 2003 survey, or by surveys prior to 2003, as summarised in Hedger & George (2004); the second column shows the host/substrate for the fungus; the third column the Collection number (nc = no collection); the fourth column shows the site where the species was first found (sites for subsequent records not shown); the last five columns show records of the species (p) for each of the five surveys.

FUNGI	SUBSTRATE / HOST	Coll No.	SITE FIRST FOUND	Nov 04	Apr 05	Jan 06	Nov 07	Nov 08
<b>MICROFUNGI</b>								
<b>'oomycetes'</b>								
<b>Peronosporales (Downy Mildews)</b>								
<i>Albugo candida</i> *	on living leaves, <i>Cochlearea officinalis</i>	258	Cliff below Jetty Road		p			
<b>Basidiomycota</b>								
<b>Uredinales (Rusts)</b>								
<i>Melampsorium cf betulinum</i> *	on living leaves, <i>Alnus glutinosa</i>	402	Walled Garden, Millcombe				p	
<i>Milesina dieteliana</i> *	on old fronds, <i>Dryopteris dilatata</i>	292	Quarry Pool			p		
<i>Milesina kriegeriana</i> *	on old fronds, <i>Polypodium vulgare</i>	291	Quarry Pool			p		
<i>Milesina scolopendrii</i> *	on old fronds, <i>Phyllitis scolopendrii</i>	316	North Quarry Ponds			p		
<i>Phragmidium violaceum</i>	on living leaves, <i>Rubus fruticosus</i> agg.	341	Walled garden, Millcombe			p		
<i>Puccinia aegopodii</i> *	on living leaves <i>Aegopodium podagraria</i>	403	Walled Garden, Millcombe				p	
<i>Puccinia caricina</i> *	on living leaves, <i>Urtica dioica</i>	225	Quarries		p			
<i>Puccinia coronata</i> *	on senescing leaves, <i>Holcus mollis</i>	235	above Jenny's Cove		p			
<i>Puccinia hieracii</i> *	on living leaves, <i>Hieracium maculatum</i>	216	Stoneycroft		p			
<i>Puccinia malvacearum</i> *	on living leaves, <i>Malva sylvestris</i>	357	Camping Field				p	
<i>Puccinia obscura</i>	on living leaves, <i>Bellis perennis</i>	nc	Castle				p	
<i>Puccinia smyrnii</i> *	on living leaves, <i>Smyrnium olusatrum</i>	217	Millcombe Valley		p	p		
<i>Puccinia umbilici</i> *	on living leaves, <i>Umbilicus rupestris</i>	215	Millcombe Valley		p	p		
<i>Puccinia violae</i> *	on living leaves, <i>Viola canina</i>	286	The Ugly		p			
<i>Uromyces dactylidis</i> *	on living leaves, <i>Ranunculus ficaria</i>	214	Millcombe Valley		p			
<i>Uromyces muscari</i> *	on living leaves, <i>Hyacinthoides non-scripta</i>	224	Quarries		p			
<b>Ustilaginales (Smuts)</b>								
<i>Ustilago violacea</i> *	in anthers of <i>Silene dioica</i>	407	Upper Millcombe Valley				p	
<b>Ascomycota</b>								
<b>Erysiphales (Powdery Mildews)</b>								
<i>Erysiphe cruciferarum</i> *	on living leaves, <i>Coincya wrightii</i>	404	Lower Millcombe Valley				p	
<i>Sphaerotheca fugax</i> *	on living leaves, <i>Geranium molle</i>	220	Millcombe Valley		p			
<i>Uncinula bicornis</i> *	senescing leaves, <i>Acer pseudoplatanus</i>	406	Millcombe Valley				p	



FUNGI	SUBSTRATE / HOST	Coll No.	SITE FIRST FOUND	Nov 04	Apr 05	Jan 06	Nov 07	Nov 08
<b>Claviceptales</b>								
<i>Claviceps purpurea</i>	on <i>Molinia caerulea</i> seed heads		Pondbury		p		p	
<b>Mitosporic Fungi</b>								
<b>'Hyphomycetes'</b>								
<i>Acremonia atra</i> *	on dead <i>Digitalis purpurea</i> stem	296	Quarter Wall			p		
<i>Cercospora juncicola</i> *	on dead <i>Juncus effusus</i> leaves	295	Quarter Wall			p		
<i>Conoplea fusca</i> *	on <i>Juncus effusus</i> litter	323	Pondbury			p		
<i>Dictyosporium toruloides</i> *	on underside of rotted <i>Pinus</i> log	335a	above Brambles			p		
<i>Monodictys castaneae</i> *	on log, <i>Acer pseudoplatanus</i>	382	St Helen's Copse				p	
<i>Periconia byssoides</i>	on dead <i>Urtica dioica</i> stems	332	Helicopter Field (West)			p		
<i>Periconia cambrensis</i> *	on dead <i>Rhododendron</i> twigs	300	Quarter Wall Bay			p		
<i>Pycnostysanus azaleae</i>	on dead <i>Rhododendron</i> buds	301	Quarter Wall Bay			p		
<i>Ramularia ari</i> *	on living leaves, <i>Arum maculatum</i>	233	Millcombe Valley		p			
<i>Ramularia didyma</i> *	on living leaves, <i>Ranunculus repens</i>	358	under wall by Helipad				p	p
<i>Symptodiella acicola</i> *	on well-rotted <i>Pinus</i> needles	334a	Pines/Gorse behind Brambles			p		
<i>Alysidium resinae</i> *	on bark of dead <i>Salix</i> trunk	427	VC Quarry					p
<i>Tetraploa aristata</i> *	on dead <i>Rhododendron</i> twigs	297	Quarry Pool			p		
<b>Coelomycetes</b>								
<i>Ascochyta molleriana</i> *	on living leaves, <i>Digitalis purpurea</i>	236	Millcombe Valley		p			p
<i>Ceuthospora hederae</i> *	on dead <i>Hedera helix</i> leaf	261	Walled Garden, Millcombe		p			
<i>Phomopsis</i> state of <i>Diaporthe arctii</i> *	on living leaves, <i>Scrophularia scorodina</i>	294	Quarry Pool		p	p		
<i>Diplodia rubi</i> *	on dead stems, <i>Rubus fruticosus</i> agg.	263	Road to Jetty			p		
<i>Phoma hedericola</i> *	on living <i>Hedera helix</i> leaf	401	Walled Garden, Millcombe					p
<i>Stagnospora innumerosa</i> *	on dead stems, <i>Juncus effusus</i>	256	Pondbury		p			p
<b>Zygomycota</b>								
<i>Pilaira anomala</i> *	on horse dung	nc	Pondbury					p
<b>MACROFUNGI</b>								
<b>Ascomycota</b>								
<b>Discomycetes</b>								
<i>Bisporella citrina</i> *	on dead branch, <i>Acer pseudoplatanus</i>	nc	St.Helens Copse				p	
<i>Coprobia granulata</i>	on sheep dung	434	Airfield					p
<i>Dasyscyphus apalus</i> *	on dead stems, <i>Juncus effusus</i>	321	Pondbury		p	p		
<i>Dasyscyphus rehmi</i> *	on dead stems, <i>Juncus effusus</i>	248	Pondbury		p			
<i>Dasyscyphus virgineus</i> *	on dead <i>Calluna</i> stems	223	Quarries		p			
<i>Geoglossum fallax</i> *	in short turf grassland	139	Acklands Moor	p				p
<i>Geoglossum glutinosum</i> *	in short turf grassland	212	Airfield Quadrat	p				
<i>Geoglossum umbratile</i> *	in short turf grassland	408	West end of Quarter Wall					p
<i>Hyaloscypha stevensonii</i> *	on underside of <i>Pinus</i> log	333	Pines/Gorse behind Brambles			p		p
<i>Lophodermium caricinum</i> *	on dead leaves, <i>Carex caespitosa</i>	284	path nr. Gannet Rock		p			

FUNGI	SUBSTRATE / HOST	Coll No.	SITE FIRST FOUND	Nov 04	Apr 05	Jan 06	Nov 07	Nov 08
<i>Lophodermium pinastri</i> *	on recently fallen <i>Pinus</i> needles	334	Pines/Gorse behind Brambles			p		p
<i>Microglossum olivaceum</i> *	in short turf grassland	174	Airfield	p				
<i>Mollisia juncina</i> *	on dead stems, <i>Juncus effusus</i>	250	Pondbury		p			p
<i>Mollisia cinerea</i>	underside of log, <i>Acer pseudoplatanus</i>	340	Millcombe Valley		p	p		p
<i>Mollisia melaleuca</i> *	on dead <i>Salix</i> sp. wood	304	Heligoland trap, Quarries			p		
<i>Myriosclerotinia curreyana</i> *	on dead stems, <i>Juncus effusus</i>	265	By Church		p			
<i>Octospora</i> sp?*	on bare soil by path	306	Frenchman's Landing			p		
<i>Orbilina coccinella</i> *	on firewood ? <i>Quercus</i> sp.	272	Helicopter Field (West)		p			
<i>Orbilina alnea</i> *	on dead <i>Alnus glutinosa</i> twigs	469	Quarter Wall Copse					p
<i>Pyrenopeziza petiolaris</i> *	on dead leaves <i>Quercus ilex</i>	239	Millcombe Valley		p			p
<i>Trichoglossum hirsutum</i> *	in short turf grassland	406a	Airfield					p
<i>Unguicularia costata</i> *	on dead stems, <i>Juncus effusus</i>	247	Pondbury		p			
<b>Pyrenomycetes</b>								
<i>Chaetapiospora rhododendri</i> *	on fallen Rhododendron leaves	300	Quarter Wall Bay			p		
<i>Chaetosphaerella phaeostroma</i> *	on bark of <i>Fraxinus excelsior</i> log	255	Millcombe Valley		p			
<i>Daldinea concentrica</i>	on <i>Fraxinus excelsior</i> log	nc	Millcombe Valley		p	p	p	p
<i>Diatrype bullata</i>	on bark, dead <i>Salix</i> sp.	305	Heligoland trap Quarry		p	p		
<i>Diatrypella quercina</i> *	on dead <i>Salix</i> sp.	282	Walled Garden, Millcombe		p			p
<i>Hypoxylon ? howeanum</i> *	on dead <i>Salix</i> sp.	281	Walled Garden, Millcombe		p			
<i>Hypoxylon fragiforme</i> *	on dead branches, <i>Fagus sylvaticus</i>	nc	Quarter Wall Copse				p	
<i>Hypoxylon serpens</i>	on decorticated <i>Pinus</i> log	339	above Brambles		p	p		
<i>Hypxylon fuscum</i>	on dead branches, <i>Alnus glutinosa</i>	468	Quarter Wall Copse					p
<i>Hysteroglyphium fraxini</i> *	on dead twigs, <i>Fraxinus excelsior</i>	232	Millcombe Valley		p			p
<i>Lembosina autographoides</i> *	on dead Rhododendron twigs	298	Quarry Pool			p		
<i>Leptopeltis nebulosa</i> *	on dead petioles, <i>Osmunda regalis</i>	293	Quarry Pool			p		
<i>Leptosphaeria acuta</i> *	on dead <i>Urtica dioica</i> stems	331	Helicopter Field (West)			p		
<i>Leptosphaeria coniothyrium</i> *	<i>Rubus fruticosus</i> , stem die back	244	back of Tavern		p			
<i>Leptosphaeria juncini</i> *	on <i>Juncus effusus</i> litter	322	Pondbury			p		
<i>Mycosphaerella ?brassicicola</i> *	on living leaves, <i>Coincya wrightii</i>	252	Road to Jetty		p		p	
<i>Nectria cinnabarina</i>	on dead twigs, <i>Acer pseudoplatanus</i>	254	The Ugly		p		p	
<i>Pleospora herbarum</i> *	on dead <i>Lonicera periclymenum</i> stem	285	Gannets' Rock		p			
<i>Rosellinia aquila</i> *	on firewood, ? <i>Quercus</i> sp.	268	Helicopter Field (West)		p			
<i>Venturia rumicis</i> *	on living <i>Rumex</i> sp. leaves	245	Helicopter Field (West)		p			
<i>Xylaria polymorpha</i>	on dead branches, <i>Acer pseudoplatanus</i>	nc	Millcombe Valley		p	p	p	p
<i>Xylaria hypoxylon</i> *	on dead branches, <i>Ulex europaeus</i>	nc	above Brambles		p	p	p	p
<b>Basidiomycota</b>								
<b>Aphylophorales'</b>								
<b>Clavariaceae</b>								
<i>Clavaria fumosa</i>	in short turf grassland	181	Airfield	p				
<i>Clavaria argillacea</i> *	on bare peat under <i>Calluna vulgaris</i>	423	John O'Groats House					p
<i>Clavulinopsis corniculata</i> *	in short turf grassland	185	Airfield	p			p	

FUNGI	SUBSTRATE / HOST	Coll No.	SITE FIRST FOUND	Nov 04	Apr 05	Jan 06	Nov 07	Nov 08
<i>Clavulinopsis corniculata*</i> (dwarf.f.)	in short <i>Festuca rubra</i> turf	157	North Light	p			p	
<i>Clavulinopsis fusiformis</i>	in tall grass/bracken	129	Beacon Hill	p			p	
<i>Clavulinopsis helvola</i>	in short turf grassland	154	Brazen Ward	p			p	p
<i>Clavulinopsis luteoalba</i>	in short turf grassland	206	NW of Halfway Wall	p			p	
<b>Polyporaceae</b>								
<i>Asterostroma medium*</i>	on dead <i>Quercus serris</i> branch	472	Quarter Wall Copse					p
<i>Ceriporia reticulata*</i>	on log, <i>Acer pseudoplatanus</i>	277	The Ugly		p			
<i>Cerocorticium confluens*</i>	on firewood ? <i>Quercus</i> sp.	273	Helicopter Field (West)		p			
<i>Chondrostereum purpureum*</i>	on wood, dead <i>Salix</i> sp.	302	Heligoland trap, Quarries			p		
<i>Coniophora puteana*</i>	on old soft wood nest box	278	The Ugly		p			
<i>Daedaleopsis confragosa</i>	on wood, dead <i>Salix</i> sp.	176	St John's Valley	p				
<i>Ganoderma adpersum*</i>	on base of dead <i>Quercus cerris</i> tree	394	back of Hotel				p	
<i>Hymenochaete cinnamomea*</i>	on <i>Rhododendron</i> stump	439	The Ugly					p
<i>Hymenochaete corrugata*</i>	on <i>Rhododendron</i> stump	227	The Ugly		p			
<i>Hymenochaete rubiginosa</i>	on log, <i>Quercus cerris</i>	nc	Quarter Wall Copse				p	
<i>Inonotus radiatus</i>	on dead tree, <i>Alnus glutinosa</i>	385	Quarter Wall Copse				p	p
<i>Lyomyces sambuci</i>	on trunk of living <i>Sambucus niger</i>	nc	Walled Garden, Millcombe				p	
<i>Peniophora cinerea</i>	on stump, <i>Pinus</i> sp.	203	Millcombe Valley	p		p		
<i>Peniophora quercina*</i>	on dead bark, <i>Salix</i> sp.	279	Walled Garden, Millcombe		p			
<i>Phanerochaete filamentosa*</i>	on log of <i>Quercus cerris</i>	440	Quarter Wall Copse					p
<i>Phanerochaete sordida</i>	on dead branches, <i>Sambucus niger</i>	405	Walled Garden, Millcombe				p	
<i>Phellinus ferrugineus*</i>	on dead <i>Rhododendron</i> stump	226	The Ugly		p	p	p	p
<i>Physisporinus sanguinolentus</i>	on bark of dead <i>Salix</i> trunk	425	VC Quarry					p
<i>Phlebia merismoides*</i>	on dead trunk, <i>Acer pseudoplatanus</i>	204	Millcombe Valley	p				
<i>Polyporus squamosus</i>	on dead <i>Ulex europaea</i> stem	359	back of Millcombe House				p	
<i>Schizopora paradoxa</i>	on dead <i>Rhododendron</i> stump	184	The Ugly	p	p	p	p	p
<i>Sistotrema brinkmannii</i>	on log, <i>Pinus</i> sp.	nc	Millcombe valley					p
<i>Stereum hirsutum</i>	on wood, dead <i>Salix</i> sp.	280	Walled Garden, Millcombe		p	p	p	
<i>Stereum rugosum*</i>	on dead <i>Rhododendron</i> stump	391	The Ugly				p	p
<i>Trametes versicolor</i>	on log, <i>Quercus ilex</i>	447	Millcombe Valley					p
<i>Vesiculomyces citrinus*</i>	on firewood, ? <i>Quercus</i> sp.	275	Helicopter Field (West)		p			
<b>Agaricales</b>								
<i>Agaricus arvensis</i>	in short turf grassland	194	Benjamin's Chair	p			p	
<i>Agaricus campestris</i>	in short turf grassland	nc	Airfield	p			p	
<i>Agaricus cf semotus*</i>	in bank on side of path	389	Quarter Wall Copse				p	
<i>Agaricus cf subperonatus*</i>	under bracken	400	Benjamin's Chair				p	
<i>Agaricus comtulus*</i>	in short turf grassland	126	The Common, nr. Old Light	p			p	
<i>Agaricus macrosporus*</i>	in short turf grassland	193	Airfield	p				
<i>Agrocybe paludosa</i>	in wet moss	209	NW of Halfway Wall	p				
<i>Alnicola scolecina*</i>	in <i>Alnus</i> leaf litter	197	St Helen's Copse	p				
<i>Alnicola suavis</i>	in <i>Salix</i> leaf litter	195	St Helen's Copse	p				

FUNGI	SUBSTRATE / HOST	Coll No.	SITE FIRST FOUND	Nov 04	Apr 05	Jan 06	Nov 07	Nov 08
<i>Armillaria mellea</i>	on dead trunk, <i>Acer pseudoplatanus</i>	173	Millcombe Valley	p				
<i>Armillaria ostoyae</i> *	on dead trunk, <i>Acer pseudoplatanus</i>	175	Millcombe Valley	p				
<i>Clitocybe cf metachroa</i> *	in piled bracken litter	172	St. John's Valley				p	
<i>Clitocybe dealbata</i>	in short turf	299	Nr. Tavern			p		
<i>Clitocybe decembris</i> (? <i>C. bicolor</i> )*	under bracken	172	St. John's Valley	p				
<i>Clitocybe graminicola</i>	on <i>Holcus mollis</i> leaf litter	167	NW of Quarter Wall	p				
<i>Clitocybe nebularis</i> *	on rushes/grass leaf litter	135	Airfield	p				
<i>Clitocybe rivulosa</i> *	in short turf grassland	200	Airfield	p				
<i>Collybia ?obscura</i>	under bracken	166	Brazen Ward	p				
<i>Collybia butyracea</i> *	under bracken	165	St James's Stone	p				p
<i>Collybia dryophila</i>	in short turf grassland	127	Airfield	p		p		p
<i>Conocybe rickenii</i> *	in tall grass	360	by track nr. Helipad				p	
<i>Conocybe subovalis</i> *	in <i>Holcus mollis</i> clump	153	NE of Quarter Wall	p				
<i>Coprinus lagopus</i> *	in tall grass	418	Airfield					
<i>Coprinus micaceus</i> *	on dead wood, <i>Salix</i> sp.	303	Heligoland trap, Quarries			p		
<i>Coprinus plicatilis</i>	in short turf grassland	237	Airfield		p			p
<i>Cortinarius sp</i> (sect. <i>Telamonia</i> )*	associated with <i>Salix repens</i>	210	Pondbury	p				
<i>Cortinarius sp</i> (sect. <i>Dermocybe</i> )*	in short turf grassland	190	Airfield	p				
<i>Cortinarius cf phaeopygmaeus</i> *	in clumps of <i>Thymus communis</i>	445	Quarter Wall Cottages					p
<i>Dermoloma sp</i>	in short turf grassland	nc	Airfield	p				
<i>Entoloma asprellum</i> *	in short turf grassland	164	Airfield	p				
<i>Entoloma clypeatum</i> *	in short turf grassland	183	Brambles	p				
<i>Entoloma conferendum</i>	in short turf grassland	142	Acklands Moor	p			p	p
<i>Entoloma lampropus</i> *	in short turf grassland	207	Acklands Moor	p				
<i>Entoloma politum</i>	in grass under <i>Salix</i> sp.	163	Quarries	p				p
<i>Entoloma sericeum</i> *	in short turf grassland	168	Brazen Ward	p				
<i>Entoloma serrulatum</i> *	in short turf/ heather	376	Middle Park				p	
<i>Entoloma turci</i> *	in short turf	450	Benjamin's Chair					p
<i>Flammulina velutipes</i>	on dead <i>Ulex europaea</i> stem	219	Bramble cottage		p	p		
<i>Galerina hypnorum</i> *	in <i>Polytrichum commune</i> /short turf	322	Battery Path			p		
<i>Galerina laevis</i> *	in <i>Leucobryum</i> moss	386	Nr. Quarter Wall Copse				p	p
<i>Galerina sphagnorum</i> *	in <i>Sphagnum</i> sp.	251	Quarries		p			
<i>Galerina tibücystis</i>	in <i>Sphagnum</i> /short grass	327	Pondbury			p		
<i>Galerina vittaeformis</i>	in moss in short turf	208	NW of Halfway Wall	p				
<i>Gerronema ericetorum</i> *	on bare peat	259	Frenchman's Landing		p		p	p
<i>Hygrocybe aurantiosplendens</i> *	in short turf grassland	171	NW of Quarter Wall	p				
<i>Hygrocybe ceracea</i>	in short turf grassland	192	Airfield	p			p	p
<i>Hygrocybe chlorophana</i> *	in short turf grassland	128	Acklands Moor	p		p	p	p
<i>Hygrocybe coccinea</i>	in short turf grassland	137	Airfield	p			p	p
<i>Hygrocybe colemaniana</i>	in rabbit-grazed turf	143	Old Light Lawn	p				
<i>Hygrocybe conica</i>	in short turf grassland	132	Acklands Moor	p				p
<i>Hygrocybe flavipes</i> *	in short turf grassland	186	Airfield	p				
<i>Hygrocybe cf fornicata</i> *	in short turf grassland	125	Lighthouse Field	p				

FUNGI	SUBSTRATE / HOST	Coll No.	SITE FIRST FOUND	Nov 04	Apr 05	Jan 06	Nov 07	Nov 08
<i>Hygrocybe insipida</i> *	in short turf grassland	158	NW of Quarter Wall	p		p	p	p
<i>Hygrocybe laeta</i> *	in short turf grassland	131	Airfield	p		p	p	p
<i>Hygrocybe persistens</i> var <i>komradii</i> *	in short turf grassland	395	Earthquake				p	p
<i>Hygrocybe pratensis</i>	in short turf grassland	133	Airfield	p		p	p	p
<i>Hygrocybe psittacina</i>	in short turf grassland	130	Beacon Hill	p		p	p	p
<i>Hygrocybe punicea</i>	in short turf grassland	124	Airfield	p		p	p	p
<i>Hygrocybe quieta</i>	in short turf grassland	177	Airfield	p				
<i>Hygrocybe cf lacmus</i> *	in short <i>Calluna vulgaris</i> heath	147	John O'Groats House	p			p	p
<i>Hygrocybe reidii</i> *	in short turf grassland	149	NE of Quarter Wall	p				
<i>Hygrocybe russocoriacea</i>	in short turf grassland	144	Middle Park	p			p	p
<i>Hygrocybe splendidissima</i> *	in short turf grassland	186a	Airfield	p			p	p
<i>Hygrocybe virginea</i> var <i>virginea</i> *	in improved pasture	148	Brickfield	p				
<i>H. virginea</i> var <i>fuscescens</i>	in short grassland	451	Golden Well					p
<i>H. virginea</i> var <i>ochraceopallida</i> *	in rabbit-grazed turf	141	Old Light Lawn	p			p	p
<i>Hygrocybe vitellina</i> *	in short turf grassland	145	NW of Quarter Wall	p				
<i>Hypholoma fasciculare</i>	on dead trunk, <i>Salix</i> sp.	nc	VC Quarry				p	
<i>Lacrymaria lachrymabunda</i> *	on rich soil	397	Benjamin's Chair				p	
<i>Lactarius cf lacunarum</i> *	under <i>Molinia</i> + <i>Myrica gale</i>	380	Central Path nr. Pondsbury				p	
<i>Lepiota cristata</i>	on <i>Quercus.cerris</i> leaf litter	388	Quarter Wall Copse				p	
<i>Lepista nuda</i>	in short turf grassland	136	Acklands Moor	p			p	
<i>Macrolepiota procera</i>	in short turf grassland	nc	Acklands Moor	p			p	
<i>Macrolepiota rhacodes</i> *	in rich grass/ <i>Urtica dioica</i>	179	Castle, East.Side	p				
<i>Marasmius oreades</i>	in short turf grassland	nc	Acklands Moor	p			p	
<i>Mycena?filipes</i> *	in clump of <i>Armeria maritima</i>	454	Above Devil's Limekiln					p
<i>Mycena aetites</i> *	in short grass	471	The Old Tennis Court					p
<i>Mycena adscendens</i> *	on dead trunk, <i>Acer pseudoplatanus</i>	257	North of The Ugly		p			
<i>Mycena alcalina</i> *	on Rhododendron stump	470	Nr. St Helen's Copse					p
<i>Mycena galopus</i> *	on dead trunk, <i>Acer pseudoplatanus</i>	390	St Helen's Copse				p	
<i>Mycena olivaceomarginata</i> *	in tall grassland	nc	Acklands Moor				p	
<i>Mycena plumbea</i> *	in tall <i>Calluna vulgaris</i> /bracken	159	NW of Quarter Wall	p				
<i>Mycena pura</i> *	in short turf grassland	182	Airfield	p				
<i>Mycenella bryophila</i> *	in short grass	458	Benjamin's Chair					p
<i>Naucoria escharoides</i>	under <i>Alnus glutinosa</i> , wet area	384	Quarter Wall Copse				p	
<i>Omphalina pyxidata</i>	on bare soil	150	Brazen Ward	p				
<i>Oudemansiella mucida</i>	on living branches, <i>Quercus cerris</i>	383	Quarter Wall Copse				p	
<i>Panaeolus rickenii</i> ( <i>P.acuminatus</i> )	in tall grassland	162	NW of Quarter Wall				p	p
<i>Panaeolus sphinctrinus</i>	on horse dung	152	NE of Quarter Wall	p			p	p
<i>Panaeolus</i> ( <i>Panaeolina</i> ) <i>foeniseii</i>	in short turf grassland	138	Acklands Moor	p	p	p	p	p
<i>Panaeolus</i> ( <i>Annellaria</i> ) <i>semiovatus</i>	on horse dung	198	Pondsbury	p				
<i>Panaeolus ater</i> ( <i>P.fimicola</i> )	in short turf grassland	nc	Acklands Moor	p		p		p
<i>Pholiota carbonaria</i> ( <i>P.highlandensis</i> )*	on bonfire site	180	The Ugly	p				
<i>Pholiota squarrosa</i> *	on dead tree, <i>Alnus glutinosa</i>	178	St Helen's Copse	p				p
<i>Pholiota adiposa</i> *	on <i>Fraxinus excelsior</i> stump	nc	Millcombe valley				p	

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<i>Psathyrella disseminata</i> *	on <i>Fraxinus excelsior</i> log	nc	Millcombe valley				p	p
<i>Psathyrella gracilis</i> *	in tall grassland	140	Beacon Hill	p				
<i>Psathyrella opaca</i> *	in tall grassland	187	Castle Cottage	p				
<i>Psilocybe semilanceata</i>	in short turf grassland	155	Brazen Ward	p			p	p
<i>Rickenella fibula</i> *	in short turf grassland	156	Castle	p			p	
<i>Russula cyanoxantha</i>	under <i>Quercus ilex</i>	442	Millcombe Valley					p
<i>Russula foetida</i>	under <i>Quercus ilex</i>	nc	Millcombe Valley					p
<i>Russula ochroleuca</i>	under <i>Quercus cerris</i>	441	Quarter Wall Copse					p
<i>Russula cf nana</i> *	under <i>Molinia</i> /Bog Myrtle ( <i>Myrica gale</i> )	379a	Central Path nr. Pondsburly				p	
<i>Russula atropurpurea</i> (=R. <i>krombholzii</i> )	under <i>Fagus sylvaticus</i>	nc	Quarter Wall Copse				p	
<i>Stropharia aeruginosa</i> *	in tall grassland	211	Airfield	p		p	p	
<i>Stropharia caerulea</i> *	in rushes plus horse dung	134	Acklands Moor	p				
<i>Stropharia pseudocyanea</i>	short grassland	455	Golden Well					p
<i>Stropharia semiglobata</i>	in tall grassland	161	NW of Quarter Wall	p				
<b>Boletales</b>								
no records								
<b>Gasteromycetales</b>								
<i>Bovista nigrescens</i>	in short turf grassland	nc	Airfield	p		p	p	
<i>Bovista plumbea</i>	in short turf grassland	nc	Acklands Moor	p		p	p	
<i>Lycoperdon (Vascellum)depressum</i>	in short turf grassland	202	Pondsburly	p				p
<i>Lycoperdon (Handkea) excipuliforme</i> *	in short turf grassland	205	Pondsburly	p				
<i>Lycoperdon foetidum</i>	in short turf grassland	169	Middle Park	p				
<i>Lycoperdon perlatum</i>	in tall grassland	330	Acklands Moor			p		
<b>Heterobasidiomycetales</b>								
<i>Auricularia auricula</i>	on dead trunk, <i>Acer pseudoplatanus</i>	201	Millcombe Valley	p			p	
<i>Dacrymyces cf capitata</i> *	on dead trunk, <i>Acer pseudoplatanus</i>	381	St Helen's Copse				p	
<i>Dacrymyces stillatus</i>	on fence post	244	Stoneycroft		p			
<b>Myxomycetes</b>								
<i>Amaurochaete tubulina</i> *	on log (? <i>A.pseudoplanatus</i> )	283	Lower Millcombe Valley		p			
<i>Arcyria denudata</i> *	on <i>Rhododendron</i> stump	229	The Ugly		p	p		
<i>Leocarpus fragilis</i> *	on grass & on <i>Calluna vulgaris</i>	170	The Cheeses	p				
<i>Physarum leucophaeum</i> *	in short turf grassland	191	Airfield	p				
<i>Trichia persimilis</i> *	on rotted <i>Pinus</i> log	nc	above Brambles					p
<i>Trichia varia</i> *	on underside of <i>Pinus</i> log	338	above Brambles			p	p	
Note: p for <i>Ustilago violacea</i> recorded 5 <sup>th</sup> May 2007								

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**The photographs of the fungi were taken by one of the authors, David George.**