

FUNGI ON LUNDY 2003

By

JOHN N. HEDGER¹ AND J. DAVID GEORGE²

¹School of Biosciences, University of Westminster,
115 New Cavendish Street, London, W1M 8JS

²Natural History Museum, Cromwell Road, London, SW7 5BD

Dedication: *The authors wish to dedicate this paper to Professor John Webster of the University of Exeter on the occasion of his 80th birthday, in recognition of his contribution to the Mycology of Southwest Britain.*

ABSTRACT

The results of a preliminary field survey of fungi carried out on Lundy between 11-18 October 2003 are reported and compared with previous records. One hundred and eight taxa were identified of which seventy five appear to be new records for the island, in spite of the very dry conditions during the survey. Habitat and resource preferences of the fungi are discussed, and suggestions made for further studies on Lundy.

Keywords: *Lundy, fungi, ecology, biodiversity.*

INTRODUCTION

Although detailed studies of the lichen flora of Lundy have been published (Noon & Hawksworth, 1972; James *et al.*, 1995, 1996), the fungi of Lundy have remained little studied. Most existing data consisted of a series of lists published in the Annual Reports of the Lundy Field Society, beginning in 1970. We could only trace three earlier records of fungi on Lundy, from 1965 and 1967, by visiting members of the British Mycological Society. The object of the present study was to start a more systematic inventory of the diversity of fungi on Lundy, and the habitats they occupy on the island, and to begin a database of Lundy fungi for entry in the British Mycological Society U.K. recording scheme. To this end, the island was visited in October 2003 for one week and a survey carried out from a base at Stoneycroft cottage. This account reviews the results and compares them with previous lists. Both 'macrofungi', larger fungi such as mushrooms and toadstools, and 'microfungi', for example hyphomycetes on litter, and rusts on plants, were included in the survey.

METHODS

Field Survey

Fungi were collected each day from 11-17 October, using plastic 9 cm Petri dishes for small specimens to prevent damage, and layers of paper in a box to separate fruit bodies of larger fungi. For each collection, the fungus was given a collection number, the site was identified by GPS to a 10 figure grid reference and the fungi were photographed using a Nikon 'Coolpix' digital camera. The habitat was noted and broadly classified into short grassland and heath, wet grassland and rushes, and woodland, including rhododendron and gorse. The substratum on which the fungus was fruiting and/or growing was also noted. This was classified as on soil, in grass, on herbivore dung, on dead wood, on leaf litter, from tree roots (mycorrhizals) and on living plants (pathogens). If possible, the identity of the wood, and the living plants and trees, was established.

Identification of the collections was carried out in the evenings, using compound and dissecting microscopes. Reference texts used for macrofungi included Dennis (1978), Phillips (1981), Moser (1983), Bon (1987), Breitenbach & Kronzlin (1981, 1986), for rusts and microfungi (Ellis & Ellis, 1997) and for aquatic hyphomycetes, Ingold (1975). Specimens were then placed in A4 envelopes for preservation by drying over a gentle heat. The labelled collection will be deposited in the Mycological Herbarium at Kew for authentication.

RESULTS

Survey Area

Although the whole island was traversed during the survey, most of the collections were made from the south-eastern end. This was due not only to the greater distance that had to be walked to survey the northern part of Lundy, but also to the absence of larger fungi, following the hot summer of 2003, and the continuing easterly winds during the visit, which had dried out the thin soils. The short turf of the central - western areas of the island and the *Festuca rubra* turf of the western cliffs also proved to be largely dry, with few macrofungi. In contrast, in the SE corner of the island, the woodlands, e.g. Millcombe valley, and also the wet grassland around Pondsbury, Quarter Wall and the Quarries proved to be better collecting areas. Even here, the absence of rain undoubtedly greatly reduced the numbers of fruit bodies. Previous surveys in early autumn seem to have had similar problems (Archer, 1971).

Species Recorded

Table 1 shows the species recorded during the survey arranged taxonomically, together with the habitat in which they occurred, the substratum on which they fruited, and the site of the collection. Table 2 lists the collecting sites and their grid reference. The fungi are divided into micro- and macro fungi, an artificial division reflecting relative size. Some 120 collections were made, consisting of 108 taxa. The list will undoubtedly undergo revision in the future once the herbarium material has been reviewed by specialist mycologists.

Previous records from Lundy are shown for comparison in Table 3, and represent a digest of lists published in previous volumes of the Annual Report of the Lundy Field Society, and records supplied by members of the British Mycological Society.

Microfungi

Microfungi were undoubtedly under-recorded in this study at 19 species, a reflection of a low search effort. However, this must be compared to the previous total of five, all plant pathogens, two downy mildews (Peronosporales), recorded in 1965, and three rusts (Uredinales), recorded in 1970 (compare Tables 1 and 3). Plant pathogens noted in the current survey included four species of rust, and one powdery mildew (Erysiphales), *Erysiphe heraclei* on hogweed (*Heracleum sphondylium*) and there was widespread occurrence of minute, black, elongated sclerotia of 'ergot', *Claviceps purpurea*, in the seed heads of purple moor grass (*Molinia caerulea*) in wet grassland around Quarter Wall Pond. Other small ascomycetes included *Rhytisma acerinum*, 'tar spot', on a sycamore (*Acer pseudoplatanus*) leaf in Millcombe valley. This record was remarkable in not only being the first for this very common UK species for Lundy, but also being represented by just one black spot on one leaf out of many thousand - perhaps the salt spray on Lundy reduces the infection of sycamore by this fungus. *Rhopoglyphus filicinus*, visible as elongated black streaks on dead petioles of sea cliff bracken (*Pteridium aquilinum*) at Brazen Ward was similarly unusually rare, perhaps for the same reason. However the purple spotting of the leaves of the rhododendron (*Rhododendron ponticum*) along the east coast path showed it was heavily infected with the mitosporic fungus ('fungi imperfecti') *Cercoseptoria handelii*, and many of the unopened black flower buds bore the pin-like fruit bodies of the cause of their death, *Pycnostysanus azaleae*, rhododendron 'bud-blast'.

The diversity of saprotrophic microfungi on Lundy remains largely unsurveyed. Just a small collection of dead stems of nettle (*Urtica dioica*) made near Benjamin's Chair rapidly yielded three microfungi under the microscope, *Torula herbarum*, *Periconia byssoides* and *Dendryphon comosum*. Another example was the result of a brief investigation of the large rush clumps at Pondsburry, which showed the dead stems in the centre to be rich in microfungi such as *Pleospora herbarum*. One interesting find was the minute pinkish fruit body of an *Endogone* species (Endogonales, Zygomycota),

found in the centre of a clump. This fungus is a hypogeous 'mini-truffle' which is rarely found, and is connected to roots of grasses and rushes with which it forms a mycorrhizal, symbiotic, partnership. The only other 'zygomycete' or 'phycomycete' found in the survey was *Pilobolus* which is a coprophilous 'pin mould' in the order Mucorales and was common as miniature forests of sparkling sporangiophores on the undersides of moist horse dung.

Freshwater habitats are also likely to produce a good list of microfungi. The strong easterlies blowing during our week on Lundy had produced foam on the western shore of Pondsburry. Samples placed under the microscope proved to be full of the branched and anguilliform spores of 'aero-aquatic' or 'Ingoldian' hyphomycete fungi, which are concentrated in foam, some of which were identified in the fresh foam on Lundy, and are listed in Table 1 (page 66), e.g. *Articulospora tetracladiella*. A full list of the fungal spores identified from a preserved foam sample will be given as part of a separate publication on the plankton of Pondsburry.

Mycetozoa

Although now classified as protistan organisms, the Mycetozoa (Myxomycetes or 'slime fungi') still continue to be studied by mycologists. Only one species had previously been recorded from Lundy, *Lycogala epidendrum*, in 1995, which forms relatively large 1 to 2cm diameter rounded fruit bodies on wood, at first bright pink, later grey-brown. This species was not encountered, but a much smaller one, *Cribraria rufa*, was abundant as troops of tiny reddish stalked sporangia on the underside of the logs of dead pines on the hill between Millcombe and St John's valleys.

Macrofungi

Most of the search effort was devoted to collections of fruit bodies of the larger fungi, such as agarics, boletes and puffballs, given that these are likely to be of most interest to the visitor. Table 1 shows that these make up the bulk of the species recorded during the survey. Most were basidiomycetes, of which the agarics or gilled fungi made up the majority at 48 species, although one species of bolete ('tube mushrooms'), 20 species of 'aphyllophorales', which includes the 'bracket fungi' or 'polypores', three species of gasteromycetes ('puffballs') and two species of heterobasidiomycetes ('jelly/ear fungi'), were also found. In addition 12 macro-ascomycetes ('cup and flask fungi') were recorded.

Table 1. Fungi Recorded on Lundy, October 11-18 2003.

FUNGI	SUBSTRATUM	HAB	COL	SITE	DATE
MICROFUNGI					
Basidiomycota					
Uredinales					
* <i>Melampsora salicis-albae</i> Kleb.	<i>Salix ?cinerea</i>	p	38	6	13.10.03
<i>Phragmidium violaceum</i> (C.F.Schultz)	<i>Rubus fruticosus</i>	p	2	1	11.10.03
Wint	agg.				
* <i>Puccinia coronata</i> Corda	<i>Holcus mollis</i>	p	33	10	12.10.03
* <i>Puccinia obscura</i> Schroet.	<i>Bellis perennis</i>	p	1	1	11.10.03
Ascomycota					
Erysiphales					
* <i>Erysiphe heraclei</i> Schleich: DC.	<i>Heracleum sphondylium</i>	p	3	1	11.10.03
Claviceptales					
* <i>Claviceps purpurea</i> (Fr.) Tul.	<i>Molinia caerulea</i>	p	10	17	11.10.03
Other ascomycetes					
* <i>Pleospora herbarum</i> (Fr.) Rabenhorst	<i>Heracleum sphondylium</i>	p	118	3	11.10.03
* <i>Rhopoglyphus filicinus</i> (Fr.) Nitsche	<i>Pteridium aquilinum</i>	p	101	7	16.10.03
Fuckel					
* <i>Rhytisma acerinum</i> (Pers.) Fr.	<i>Acer pseudoplatanus</i>	p	83	1	16.10.03
Mitosporic fungi ('fungi imperfecti')					
* <i>Anguillospora longissima</i> (de Wild.)	Aquatic debris	l	122	23	14.10.03
Ingold					
* <i>Articulospora tetracladia</i> Ingold	Aquatic debris	l	119	23	14.10.03
* <i>Cercoseptoria handelii</i> (Bubak)	<i>Rhododendron ponticum</i>	p	114	3	11.10.03
Deighton					
* <i>Dendryphion comosum</i> Wallr.	<i>Urtica dioica</i>	l	115	12	16.10.03
* <i>Lunulospora curvula</i> Ingold	Aquatic debris	l	120	23	11.10.03
* <i>Periconia byssoides</i> Pers.	<i>Urtica dioica</i>	l	116	12	16.10.03
* <i>Pycnostysanus azaleae</i> (Peck) Mason	<i>Rhododendron ponticum</i>	p	18	3	12.10.03
* <i>Septoria hederæ</i> Desm.	<i>Hedera helix</i>	p	4	1	11.10.03
* <i>Torula herbarum</i> (Pers.) Link	<i>Urtica dioica</i>	l	117	12	11.10.03
* <i>Varicosporum elodeae</i> Kegel	Aquatic debris	l	121	23	14.10.03

FUNGI	SUBSTRATUM	HAB	COL	SITE	DATE
Zygomycota ('phycomycetes')					
Endogonales					
* <i>Endogone sp</i>	<i>Juncus articulatus</i>	m	5	17	11.10.03
Mucorales					
* <i>Pilobolus sp.</i>	Horse dung	d	nc	10	16.10.03
MACROFUNGI					
Ascomycota					
* <i>Chlorocyboria aeruginascens</i> (Nyl.) Kan.	<i>Fagus sylvatica</i>	w	106	5	16.10.03
* <i>Coprobria granulata</i> (Bull.: Fr.) Boud.	Dung	d	78	17	15.10.03
* <i>Daldinea concentrica</i> (Boet.) de Not.	<i>Fraxinus excelsior</i>	w	15	14	12.10.03
* <i>Diaporthe leiphaemia</i> (Fr.) Sacc.	<i>Quercus cerris</i>	w	108	14	16.10.03
* <i>Diatrype bullata</i> (Hoffm.: Fr.) Tul.	<i>Salix ?cinerea</i>	w	48	11	13.10.03
* <i>Eutypa flavovirens</i> (Pers.: Fr.) Tul.	<i>Acer pseudoplatanus</i>	w	47	11	13.10.03
* <i>Hypoxylon multiforme</i> (Fr.) Fr.	<i>Rhododendron ponticum</i>	w	102	20	16.10.03
* <i>Hypoxylon serpens</i> (Pers.: Fr.) Fr.	<i>Acer pseudoplatanus</i>	w	107	5	16.10.03
* <i>Mollisia benesuada</i> (Tul.) Phill.	<i>Alnus glutinosus</i>	w	104	5	16.10.03
* <i>Mollisia cinerea</i> (Batsch : P.Karst arst.	<i>Salix ?cinerea</i>	w	123	6	16.10.03
* <i>Nectria cinnabarina</i> (Tode) Fr.	<i>Acer pseudoplatanus</i>	w	25	14	12.10.03
<i>Xylaria polymorpha</i> (Pers.) Greville	<i>Acer pseudoplatanus</i>	w	16	14	12.10.03
Basidiomycota					
Heterobasidiomycetales					
<i>Auricularia auricula-judae</i> (L.) Schroet.	<i>Sambucus niger</i>	w	43	1	13.10.03
<i>Tremella mesenterica</i> Retz.	<i>Ulex europaeus</i>	w	64	13	14.10.03
'aphyllophorales'					
* <i>Clavariadelphus contortus</i> (Fr.) Pil.	<i>Alnus glutinosus</i>	w	26	5	12.10.03
<i>Clavulinopsis fusiformis</i> (Fr.) Corner	Grassland	s	110	22	17.10.03
* <i>Coniophora puteana</i> (Schum.:Fr.) Karst.	<i>Rhododendron ponticum</i>	w	63	13	14.10.03
<i>Daedaleopsis confragosa</i> (Bolt.) Schroet.	<i>Salix ?cinerea</i>	w	28	6	12.10.03

FUNGI	SUBSTRATUM	HAB	COL	SITE	DATE
* <i>Fistulina hepatica</i> (Sch.) Fr.	<i>Castanea sativa</i>	w	60	14	14.10.03
* <i>Hymenochaete rubiginosa</i> (Dicks.:Fr.) LËv.	<i>Salix ?cinerea</i>	w	92	6	16.10.03
<i>Inonotus radiatus</i> (Sow.) Karst.	<i>Alnus glutinosus</i>	w	nc	5	12.10.03
* <i>Lyomyces sambuci</i> (Pers.) Karst.	<i>Sambucus niger</i>	w	46	1	13.10.03
* <i>Peniophora cinerea</i> (Fr.) Cooke	<i>Alnus glutinosus</i>	w	24	5	12.10.03
* <i>Phanerochaete sordida</i> (Karst.) Erikss. & Ryv.	<i>Rhododendron ponticum</i>	w	113	20	17.10.03
* <i>Phellinus contiguus</i> (Fr.) Pat.	<i>Alnus glutinosus</i>		22	5	12.10.03
* <i>Phellinus ferruginosus</i> (Schr.: Fr.) Pat.	<i>Alnus glutinosus</i>	w	22	5	12.10.03
* <i>Phellinus tuberculatus</i> (Baumg.) Niemelä	<i>Prunus spinosus</i>	w	61	13	14.10.03
* <i>Physisporinus sanguinolentus</i> (A. & S.: Fr.) Pilat	<i>Salix ?cinerea</i>	s	97	6	16.10.03
<i>Polyporus squamosus</i> Fr.	<i>Ulex europaeus</i>	w	80	1	15.10.03
* <i>Postia caesia</i> (Schr.) Karst.	<i>Salix ?cinerea</i>	w	111	6	17.10.03
* <i>Schizopora paradoxa</i> (Schr.:Fr.) Donk	<i>Alnus glutinosus</i>	w	23	5	12.10.03
* <i>Sistotrema brinkmanii</i> (Bres.) J. Erikss.	<i>Salix ?cinerea</i>	w	31	6	12.10.03
* <i>Stereum hirsutum</i> (Willd.:Fr.) S.F. Gray	<i>Ulex europaeus</i>	w	65	13	14.10.03
* <i>Trametes versicolor</i> (L.) Pil.	<i>Malus</i> sp.	w	42	1	13.10.03
Agaricales					
<i>Agaricus arvensis</i> Sch.	Grassland	s	82	12	16.10.03
<i>Agaricus campestris</i> Linn.	Grassland	s	13	7	11.10.03
* <i>Agaricus koelerionensis</i> Bon.	Grassland	s	67	18	15.10.03
<i>Agrocybe paludosa</i> (Lge.) Kuhn. & Romagn.	Rushes	s	77	17	15.10.03
<i>Agrocybe</i> sp	Rich soil	s	87	1	16.10.03
* <i>Alnicola suavis</i> (Bres.) Kuhn.	Under <i>Salix ?cinerea</i>	s	98	6	16.10.03
<i>Annellaria semi-ovata</i> (Sow. ex Fr.) Pears. & Dennis	Horse dung	d	34	10	12.10.03
<i>Clitocybe dealbata</i> (Sow.) Kumm.	Grassland	s	99	21	16.10.03
<i>Collybia dryophila</i> (Bull.) Kumm.	<i>Calluna</i> moor	l	32	8	12.10.03
* <i>Collybia obscura</i> Favre	Grassland	s	30	7	12.10.03
<i>Collybia velutipes</i> (Curt. ex Fr.) Kumm.	<i>Ulex europaeus</i>	w	54	13	14.10.03
<i>Conocybe</i> sp.	Grassland	s	74	17	15.10.03
<i>Coprinus atramentarius</i> (Bull.) Fr.	Rich soil	s	41	1	13.10.03

FUNGI	SUBSTRATUM	HAB.	COL	SITE	DATE
* <i>Coprinus plicatilis</i> (Curt.) Fr.	Grassland	s	9	21	11.10.03
* <i>Coprinus stercoreus</i> (Scop.) Fr. ss. P.D. Ort. & Watl.	Horse dung	d	68	17	15.10.03
* <i>Entoloma araneosum</i> (Quel.) Moser	Grassland	s	37	24	13.10.03
<i>Entoloma cephalotrichum</i> (Orton) Noord.	Grassland	s	6	17	11.10.03
* <i>Entoloma politum</i> (Pers.: Fr.) Donk	Rushes	s	40	11	13.10.03
* <i>Entoloma staurosporium</i> (Bres.) Hk.	Rushes	s	76	17	15.10.03
* <i>Flammulaster granulosa</i> (Lange) Watl.	Soil under <i>Alnus glutinosus</i>	s	89	5	16.10.03
* <i>Galerina tibiicystis</i> (Atk.) Kuhn	<i>Sphagnum</i>	s	11	17	11.10.03
* <i>Galerina vittaeformis</i> (Fr.) Sing.	Grassland	s	49	1	13.10.03
<i>Gymnopilus junonius</i> (Fr.: Fr.) Ort.	Pine stump	w	59	16	14.10.03
<i>Hygrophoropsis aurantiacus</i> (Wulf.) R. Mre.	Under <i>Pteridium</i>	l	29	7	12.10.03
* <i>Hypholoma elongatum</i> (Pers.) Ricken.	Rushes	s	75	17	15.10.03
<i>Hypholoma fasciculare</i> (Huds.) Kumm.	<i>Rhododendron ponticum</i>	w	95	6	16.10.03
* <i>Hypholoma subericaceum</i> (Fr.) Kumm.	<i>Calluna moor</i>	s	8	7	11.10.03
* <i>Lepiota cristata</i> (Bolt.) Kumm.	Under <i>Rhododendron ponticum</i>	s	19	3	12.10.03
<i>Macrolepiota procera</i> (Scop.) Sing.	Grassland	s	81	11	16.10.03
<i>Marasmius oreades</i> (Bolt.) Fr.	Grassland	s	57	12	14.10.03
* <i>Mycena aetites</i> (Fr.) QuÈl.	Rushes	s	53	6	14.10.03
* <i>Mycena erubescens</i> Hoen.	<i>Alnus glutinosus</i>	w	27	5	12.10.03
* <i>Megacollybia platyphylla</i> (Pers.) Kotl. & Pouz.	<i>Salix ?cinerea</i>	w	94	6	16.10.03
<i>Mycena filopes</i> (Bull.) Kumm.	Grassland	s	52	15	14.10.03
<i>Oudemansiella mucida</i> (Schrad.: Fr.) v.Hoehn	<i>Fagus sylvatica</i>	w	100	5	16.10.03
* <i>Panaeolina foenisecii</i> (Pers.: Fr.) R.Mre.	Horse dung	d	71	19	15.10.03
* <i>Panaeolus sphinctrinus</i> (Fr.) Quel.	Horse dung	d	72	17	15.10.03
* <i>Pluteus cervinus</i> (Batsch.) Fayod	<i>Salix ?cinerea</i>	w	93	6	16.10.03
* <i>Psathyrella hydrophila</i> (Bull.) R.Mre.	<i>Salix ?cinerea</i>	w	96	6	16.10.03
* <i>Psilocybe coprophila</i> (Bull.) Kumm.	Sheep dung	d	7	17	11.10.03
* <i>Psilocybe merdaria</i> (Fr.) Ricken.	In <i>Hydrocotyle</i> bed	s	12	17	11.10.03
<i>Psilocybe semi-lanceata</i> (Fr.) Kumm.	Grassland	s	70	21	15.10.03
* <i>Rickenella fibula</i> (Bull.) Raithel.	Grassland	s	56	12	14.10.03
* <i>Russula albonigra</i> (Krombh.) Fr.	Under <i>Quercus cerris</i>	m	55	14	14.10.03

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<i>Russula krombholzii</i> Shaffer (= <i>R. atropurpurea</i>)	Under <i>Fagus sylvatica</i>	m	91	5	14.10.03
<i>Russula ochroleuca</i> Pers.	Under <i>Quercus ilex</i>	m	84	14	12.10.03
<i>Stropharia semi-globata</i> (Batsch.) Quel.	Sheep dung	d	nc	17	11.10.03
* <i>Volvariella speciosa</i> (Fr.) Sing.	Rich soil	s	39	11	13.10.03
Boletales					
* <i>Xerocomus spadiceus</i> (Fr.) QuÉl.	Under <i>Fagus sylvatica</i>	m	90	5	16.10.03
Gasteromycetales					
<i>Bovista nigrescens</i> Pers.: Pers.	Grassland	s	79	17	15.10.03
<i>Bovista plumbea</i> Pers.: Pers.	Grassland	s	14	21	11.10.03
<i>Vascellum depressum</i> (Bon.) Àmarda	Grassland	s	35	6	13.10.03
MYCETOZOA					
* <i>Cribraria rufa</i> (Roth.) Rostaf.	Pine stump	w	85	14	16.10.03

Key. Fungi- taxa of fungi recorded, (*=new record). **Substratum-** associated plants/resources; **Hab.-** the habitat where they were recorded as fruiting (**p**, as a pathogen on a plant; **l**, on leaf litter; **w**, on dead wood; **g**, grassland; **s**, soil; **m**, mycorrhizal; **d**, on herbivore dung). **Col.-**field collection number (**nc**, no collection). **Site-**site of collection (for details see Table 2). **Date-**date of field collection.

Macro-ascomycetes This group of fungi have been poorly recorded on Lundy, in spite of their high diversity in the UK. Of the 12 species found (Table 1), seven were in the order Sphaeriales, characterised by hard woody fruit bodies that had survived the drought. This is a considerable increase over the previous record of just one species, *Xylaria polymorpha*, (compare Table 3), the large black finger-like fruit bodies of which were still common on dead sycamore (*Acer pseudoplatanus*) in the Millcombe Valley, where it was previously found in 1995 (Table 3). Even more prominent at Millcombe were the black rounded 'King Alfred's cakes' of *Daldinia concentrica* on ash (*Fraxinus excelsior*), and it is difficult to see how these could have been overlooked in the past. The smaller, usually black or brown, fruit bodies of other Sphaeriales and allied fungi were less easily found, but common; for example the humid dingle just below 'Brambles' cottage was very productive, yielding *Hypoxylon serpens* and *Eutypa flavovirens* on sycamore branches, the orange spots of *Nectria cinnabarina* on the twigs, with *Diaporthe leiphaemia* on turkey oak (*Quercus cerris*) twigs. Elsewhere *Hypoxylon multifforme* was common on dead rhododendron and *Diatrype bullata* on willow (*Salix ?cinerea*) at the Quarries.

Only three fleshy ‘cup fungi’ were found, two were small (2-3 mm diameter) grey apothecia of *Mollisia* species, *M. cinerea* and *M. bensusada*, on the underside of rotten branches, and one, the minute orange apothecia of *Coprobria granulata*, on dung pats in the wet grassland at Quarter Wall. This paucity was in spite of a search of the usual habitats for these fungi, such as old bramble stems and deep leaf litter, a reflection of the extremely dry conditions.

Table 2. Description and location of the collecting sites on Lundy referred to in Table 1.

SITE NO.	DESCRIPTION	N.G. REFERENCE
1	Millcombe valley near walled garden	SS 13950 43959
2	East coast path - <i>Quercus cerris</i> clump	SS 14152 43950
3	Sugar Loaf - <i>Rhododendron ponticum</i> thicket	SS 13944 44213
4	East coast path – grass	SS 13922 44596
5	East coast path - St Helen’s Copse/Quarter Wall Copse	SS 13933 44820
6	Quarries, Heligoland trap - <i>Salix</i> thicket	SS 13845 45106
7	East coast path near Brazen Ward - under bracken	SS 13668 47077
8	East coast path - under <i>Calluna</i>	SS 13305 47542
9	West coast path - in grass	SS 13367 46135
10	Half Way Wall - in grass	SS 13362 45861
11	St John’s.valley - wet grassland. <i>Salix</i> with <i>Carex paniculata</i>	SS 13950 43959
12	Benjamin’s Chair - short grass, nettle clump	SS 13733 43779
13	Brambles – gorse thicket above cottage	SS 13953 44013
14	SW side Millcombe valley – South Wood	SS 13898 44022
15	Flagpole – gorse & grass	SS 13960 44143
16	NE of Millcombe House - pine stump	SS 13902 44119
17	Quarter Wall Pond - wet grassland/ rushes	SS 13630 44965
18	Quarry Pool - short grass	SS 13756 45037
20	East Coast path - <i>Rhododendron ponticum</i> thicket	SS 13945 44746
21	Airfield - short grass	SS 13451 44624
22	Brazen Ward - short grass	SS 13760 46525
23	Pondsbury - <i>Molinia</i> grassland	SS 13450 45342
24	Rocket Pole - short grass. <i>Ulex gallii</i> scrub	SS 13512 43653

Table 3. Fungi Recorded from Lundy in Previous Surveys.

	FIELD NOTES/SUBSTRATUM	HAB.	YEAR					
			<70	70	71	72	87	92
MICROFUNGI								
'oomycetes'								
Peronosporales								
<i>Peronospora obovata</i> *	<i>Spergularia</i> sp.	p	+					
<i>Plasmopara crustosa</i> *	<i>Angelica sylvestris</i>	p	+					
Basidiomycota								
Uredinales								
<i>Melampsora amygdalinae</i>	<i>Salix</i> sp.	p		+				
<i>Phragmidium violaceum</i>	<i>Rubus fruticosus</i>	p		+				
<i>Uromyces scrophulariae</i>	<i>Scrophularia aquatica</i>	p		+				
MACROFUNGI								
Ascomycota								
<i>Xylaria polymorpha</i>	Sycamore trunk, Millcombe	w						+
Basidiomycota								
Heterobasidiomycetales								
<i>Auricularia auricula</i>	Elder/sycamore	w		+				
<i>Tremella mesenterica</i>	Gorse	w	+	+		+		
<i>Dacrymyces deliquescens</i>	Wood	w		+				
'Aphylophorales'								
<i>Bjerkandera adusta</i>	Alder, St Helen's Copse	w						+
<i>Clavaria cinerea</i>	?	w	+					
<i>Clavulinopsis fusiformis</i>	Grassland	g						
<i>Clavulinopsis helvöla</i>	Heathland	g				+		
<i>Daedaleopsis confragosa</i>	Dead willow	w						
<i>Inonotus radiatus</i>	Alder, St Helen's Copse	w						+
<i>Polyporus squamosus</i>	Dead wood	w	+			+		
<i>Polyporus tuberaster</i>	?	w					+	
<i>Polyporus varius</i>	Dead gorse, St John's valley	w						+
<i>Schizopora paradoxa</i>	Dead sycamore branch	w						+
<i>Serpula lacrymans</i>	? = ? <i>Coniophora puteana</i>	w		+				
Agaricales								
<i>Agaricus arvensis</i>	Grassland	g				+		
<i>Agaricus campestris</i>	Grassland	g		+		+	+	

	FIELD NOTES/SUBSTRATUM	HAB.	YEAR							
			<70	70	71	72	87	92	95	
<i>Agrocybe cylinderacea</i>	Living sycamore trunk, St Helen's Copse	g								+
<i>Armillaria mellea</i>	?	w	+							
<i>Bolbitius vitellinus</i>	S. of Old Light ?grass	g				+				
<i>Clitocybe dealbata</i>	In grass	g			+					
<i>Clitocybe</i> sp.	Amongst heather	g						+		
<i>Collybia dryophila</i>	Woodland	w						+		
<i>Collybia maculata</i>	Quarries	l		+						
<i>Collybia velutipes</i>	?	w	+							
<i>Conocybe tenera</i>	Airfield	g		+						
<i>Coprinus atramentarius</i>	?	g		+						
<i>Coprinus niveus</i>	Dung	d						+		
<i>Entoloma</i>	Grassland	g						+		
<i>porphyrophaeum</i>										
<i>Galerina hypnorum</i>	In grass	g		+	+					
<i>Galerina paludosa</i>	Pondsburry, in <i>Sphagnum</i>				+					
<i>Gymnopilus junonius</i>	Under willow (Quarries)	s		+	+					
<i>Hebeloma</i> sp.	New Barn	m				+				
<i>Hygrocybe</i>	?	g	+							
<i>calyptraeformis</i>										
<i>Hygrocybe ceracea</i>	?	g	+							
<i>Hygrocybe 'citrina'</i>	Grassland	g						+	+	
<i>Hygrocybe coccinea</i>	Quarries	g		+						
<i>Hygrocybe</i>	Grassland	g						+		
<i>colemanniana</i>										
<i>Hygrocybe conica</i>	Grassland/Airfield	g		+				+		
<i>Hygrocybe miniata</i>	?	g							+	
<i>Hygrocybe nivea</i>	Quarries	g		+						
<i>Hygrocybe obrussea</i>	Common	g		+						
<i>Hygrocybe pratensis</i>	Grassland	g						+	+	
<i>Hygrocybe psitaccina</i>	Grassland	g						+	+	
<i>Hygrocybe punicea</i>	?	g						+		
<i>Hygrocybe quieta</i>	Grassland	g							+	
<i>Hygrocybe</i>	Grassland	g						+		
<i>russocoriacea</i>										
<i>Hygrocybe turunda</i>	S. of Old Light? grass	g				+				
<i>Hypoloma fasciculare</i>	Woodland	w						+		
<i>Lactarius pubescens</i>	?	m	+							
<i>Lactarius subumbonatus</i>	?	m	+							
<i>Lactarius torminosus</i>	?	m		+						
<i>Leptonia sericellus</i>	?	g		+						

	FIELD NOTES/SUBSTRATUM	HAB.	YEAR						
			<70	70	71	72	87	92	95
<i>Macrolepiota procera</i>	Grassland	g	+	+				+	+
<i>Marasmius oreades</i>	Heathland	g		+				+	
<i>Marasmius rotula</i>	Dead sycamore twigs, St Helen's Copse	w		+					+
<i>Mycena alcalina</i>	Quarries	w		+					
<i>Mycena capillaris</i>	Lower East Side path	g		+					
<i>Mycena filopes</i>	Lower East Side path	g		+					
<i>Mycena leptcephala</i>	Grassland	g						+	
<i>Mycena olivaceo-marginata</i>	Lower East Side path	g		+					
<i>Mycena tintinnabulum</i>	?	w				+			
<i>Naucoria escharoides</i>	Under willow	g				+			
<i>Omphalina sphagnicola</i>	Pondsbury	g							
<i>Omphalina pixidata</i>	?	g							+
<i>Oudemansiella mucida</i>	?	w	+						
<i>Panaeolus retirugis</i>	Common	d		+					
<i>Panaeolus rickenii</i>	Field above Goldfish Pond	d				+	+		
<i>Panaeolus semi-ovatus</i>	Dung	d		+		+	+	+	
<i>Panaeolus uliginosus</i>	Common	d		+					
<i>Panus torulosus</i>	?	w		+					
<i>Pleurotus ostreatus</i>	Dead holly, Millcombe	w							+
<i>Psathyrella candolleana</i>	Soil under alder, St Helen's copse	g							+
<i>Psathyrella disseminata</i>	?	w	+						
<i>Psilocybe semi-lanceata</i>	Grassland	g						+	
<i>Russula emetica</i>	?	m	+						
<i>Russula atropurpurea</i>	Rhododendrons	m	+					+	
<i>Russula ochroleuca</i>	Rhododendrons	m	+				+		
<i>Stropharia semi-globata</i>	Dung	d		+		+	+	+	
<i>Tricholoma gambosum</i>	New Barn	g					+		
<i>Tubaria</i> agg.	Dead deciduous branches, Millcombe	w							+
Boletales									
<i>Boletus bovinus</i>	Lower East Side path	m	+						
<i>Boletus duriusculus</i>	Airfield	m	+						
<i>Boletus sanguineus</i>	?	m	+						
<i>Boletus subtomentosus</i>	Lower East Side path	m	+						
Gasteromycetales									
<i>Bovista nigrescens</i>	Soil near Marisco Castle	g		+					+

	FIELD NOTES/SUBSTRATUM	HAB.	YEAR							
			<70	70	71	72	87	92	95	
<i>Bovista plumbea</i>	?	g		+						
<i>Calvatia gigantea</i>	S.W.Field	g		+						
<i>Lycoperdon perlatum</i>	?	w		+						
<i>Lycoperdon pyriforme</i>	?	w					+			
<i>Lycoperdon</i> sp.	?	w				+				
<i>Scleroderma citrinum</i>	?	m							+	
<i>Vascellum depressum</i>	Airfield	g		+				+		
MYCETOZOA										
<i>Lycogala epidendrum</i>	Dead sycamore, Millcombe	w								+

Key. Fungi - taxa of fungi recorded;

Field notes/substratum - details in record, (? , no details in record);

Hab.- estimate of the substratum or habitat where the fungi were probably fruiting (**p**, as a pathogen on a plant; **l**, on leaf litter; **w**, on dead wood; **g**, grassland; **s**, soil; **m**, mycorrhizal; **d**, on herbivore dung). **Year** - year of record, (<70, pre 1970).

Recorders: Pre-1970. Arthur Strick (17 records), in Walker & Langham (1970).

1970; A.J.B. Walker & M.S. Langham August 1970 (36 records), S. Archer no date (9 records) in Walker & Langham (1970). **1971.** S.A. Archer 6 June 1971 (1 record) 9th October 1971 (7 records); A.J.B. Walker May 1971 (3 records) in *Report of the Lundy Field Society* 22, 43. **1972.** R. Montagu 9-12 September 1972 (8 records) in Montagu, R. (1972). **1987.** H. Wilson 10-17 October 1987 (33 records) in Wilson, H. (1987). **1992.** Anon. (13 records) *Report of the Lundy Field Society* 43, 117. **1995.** A.J. Parsons & J.G. Keylock August 1995 (12 records) in Parsons & Keylock (1995). Two additional records from British Mycological Society data for August 1965 (anon., unpublished) are shown as *.

Some records have been omitted as uncertain. Incorrectly spelt names in records have been corrected. Nomenclature in original lists has been largely retained, but the genus *Lepiota* has been changed to *Macrolepiota*, *Hygrophorus* to *Hygrocybe*. All are field identifications, and, with the exception of Helen Wilson (1987) who deposited some freeze-dried material in Plymouth University, and one collection of *Marasmius oreades* in Kew (87443), no herbarium material from Lundy apparently exists.

Macro-basidiomycetes

Tremellales Two members of this order of gelatinous fungi were found, both on dead wood: the 'ear fungus', *Auricularia auricula-judae*, on elder (*Sambucus niger*)

in the walled garden at Millcombe and the bright orange ‘jelly fungus’, *Tremella mesenterica*, on gorse (*Ulex europaeus*) above ‘Brambles’. Both are obvious fungi and have been recorded in Millcombe before (Table 3). Interestingly, one of the commonest UK species in this order, *Dacrymyces deliquescens (stillatus)*, which forms small rounded orange fruit bodies on bare wood, was not found, although recorded in previous surveys (Table 3).

Aphyllophorales These fungi include the fleshy ‘fairy clubs’ (Clavariaceae), as well as the families of corky or woody ‘bracket fungi’. Previous records were of eleven species (Table 3). Two species of Clavariaceae were recorded, of which *Clavariadelphus contortus* was a new record. This is an uncommon UK species, with a grey-brown twisted club-shaped fruit body and was found on dead, wet, branches of alder (*Alnus glutinosus*) in the spring in St Helen’s Copse. *Clavulinopsis fusiformis*, a beautiful coral-like fungus, with bright orange fruit bodies, was found as a single fruiting in grass near Brazen Ward, but should have been much commoner, having been recorded before (see Table 3), but had been affected by the drought, like all the other grassland fungi on Lundy. The majority of the Aphyllophorales found on Lundy were resupinate (‘crust-like’) species fruiting on dead wood. As to be expected, the mixed woodland in the Millcombe valley area, and the rhododendrons and small woodland patches along the eastern coastal path, including St Helen’s Copse, with alder (*Alnus glutinosus*) and, Quarter Wall Copse, with beech (*Fagus sylvaticus*) and turkey oak (*Quercus cerris*), were the productive sites. Of the fruit bodies found, easily the most abundant were the white to cream patches of the ‘toothed’ pored *Schizopora paradoxa*, which was common on the underside of fallen dead branches and trunks of a wide variety of deciduous trees, especially sycamore in the Millcombe valley. This fungus was previously noted by Parsons & Keylock (1995). Other common resupinates, with an inconspicuous grey, white and brown crustose appearance, on dead twigs and branches, but without pores, and easily confused without microscopy, were species of *Hymenochaete*, *Peniophora*, *Coniophora*, *Sistotrema*. Some of these species had taken the opportunity of colonising the dead stumps created by the rhododendron clearing operations, most especially the cream to yellow *Coniophora puteana*, which was very abundant. An easily found example of these resupinate fungi was *Lyomyces sambuci* which occurred as prominent white patches set on moss on old trunks of elder (*Sambucus niger*) in the walled garden at Millcombe. A particularly interesting resupinate, *Physisporinus sanguinolentus*, a delicate, white, fleshy, pored fruit body, staining bright red on bruising, was found on damp soil under moss and dead willow at the Quarries.

Of the larger and more obvious ‘bracket fungi’, with shelf or hoof-shaped fruit bodies, eight had been previously recorded due to their size and prominence (compare Tables 1 and 3). These included the ‘blushing bracket’ (*Daedaleopsis confragosa*), which occurred on dead willow at the Quarries, and has coarse pores on the underside which rapidly bruises purple on handling, and *Inonotus radiatus*, a large brown bracket fungus on the alders in St.Helen’s Copse. This site contained other Aphyllophorales previously unrecorded, including *Phellinus contiguus*, a reddish-brown, coarsely pored

fruit body, on dead alder branches. This resembles the commoner *P. ferrugineus*, which was also found close by, but which differs in having smaller pores and different microscopic characteristics. Another *Phellinus*, *P. tuberculosus*, also previously unrecorded, was found behind 'Brambles', as large perennial hoof-shaped fruit bodies on dead sloe (*Prunus spinosus*). However this fungus was also found on dead gorse (*Ulex europaeus*) at this site (Plate 2 at end of this volume), an unusual host, a topic which will be returned to later in discussing niche preferences of fungi on Lundy. Similarly, the red fleshy brackets of the aptly named 'beef steak mushroom', *Fistulina hepatica*, were found nearby, growing on sweet chestnut (*Castanea sativa*) on the south side of Millcombe valley, again an unusual host, since this fungus is usually associated with oak.

Agaricales

Agarics in grassland The majority of the records of agarics came from the grassland, although some were found in the woodland and in the walled garden. Of the larger toadstools found in grassland, the *Agaricus* ('mushroom') species were of particular interest. The white-capped 'field mushroom', *Agaricus campestris*, was reasonably common, in spite of the dry conditions, and has been recorded and eaten often in the past (Table 3). It also seemed to be present as a form with a roughened scaly brown cap, particularly in the *Calluna* heath at the northern end of the island. This may be a variety *A. campestris fuscopilosellus* (Moell.) Pil. or it may have been a morphology induced by the dry conditions. Alternatively it may be *A. cupreobrunneus* (J.Schaeff. & Steer:Moell.) Pil., a species said to be characteristic of dry sandy places (Courtecuisse & Duhem, 1995). Another *Agaricus* species, represented by a single fruit body in short turf by Quarry Pool, was tentatively named as *A. koelerionensis*, a grassland species which slowly turns red on bruising, and which is uncommon in the UK. *Agaricus arvensis*, the 'horse mushroom', normally a large fungus, and recorded in the past (Table 3), was only found by Benjamin's Chair, as two very small unexpanded mushrooms, a reflection again of the drought.

In contrast the size of the 'parasol mushroom', *Macrolepiota procera*, seemed to be unaffected by the drought and troops of large specimens were found in the South West Field near the Lundy Old Light (see Plate 3 at end of this volume). This prominent edible mushroom has also been recorded (as *Lepiota procera*) in the past and is a striking feature of any autumnal walk on the island. The only other large agaric found was the attractive *Volvarellia speciosa*, a tall 'toadstool', with a pale brown pointed cap and bright pink gills, a single specimen of which was found growing in rich soil outside 'Brambles'.

Smaller agarics were found in grassland during the survey, but the numbers were disappointing, considering the potential richness of this habitat. The shorter grassland was practically devoid of species, as was the heathland. The only exception was the small agaric *Collybia obscura*, which has an unpleasant smell, and a tough purple-

brown velvety cap, white lamellae and stipe. It was found frequently in dry peat and short grass in the north of the island. Similarly the 'false chanterelle', *Hygrophoropsis aurantiacus*, a medium sized funnel-shaped orange toadstool with closely spaced decurrent lamellae, was quite common under bracken in peaty soil, especially near Brazen Ward.

On the other hand, *Rickenella fibula*, a tiny orange toadstool, 5 mm high, with a depressed cap and decurrent gills, might have been expected to be very common in the short rabbit-grazed turf so widespread on Lundy, but only one fruit body was found, near Rocket Pole. Growing alongside it were two fruit bodies of the 'fairy ring champignon', *Marasmius oreades*, which should have been equally common, and although darkened grass rings were seen elsewhere, no more fruit bodies were found. Similarly, the normally common fungus of sheep-grazed grassland, *Psilocybe semi-lanceata*, the 'liberty cap', was limited to one fruit body found in the Brick Field, as was the short-lived 'ink cap', *Coprinus ephemerus*. The genus *Hygrocybe* ('wax caps'), containing many brightly coloured grassland species, such as the 'scarlet wax cap', *H. coccinea*, was completely absent, even though past records show 15 species have been recorded on Lundy (Table 3), more than any other genus of fungus.

Most success was had in the higher, wetter, grassland, especially near Quarter Wall Pond, where rush clumps were mixed with long grass. Here the genera *Galerina*, *Entoloma*, and *Mycena* were well represented. *Galerina* species have delicate brown to yellowish brown striate caps, yellowish brown lamellae (gills) and long pale brown stipes which arise from within moss or grass roots. *G. tibiicystis* and *G. vittaeformis* (probably previously recorded as *G. hypnorum*, Table 3) were collected. *Mycena* has a similar stature and habit, but grassland species are usually grey, with white lamellae. Two were found: *M. aetites* and *M. filopes*; the latter has been previously recorded alongside three other grassland mycenas, *M. olivaceo-marginata*, *M. leptcephala*, *M. capillaris* (Table 3). *Entoloma*, a genus of small agarics with pink gills and greyish or bluish caps, should have been common in grassland on Lundy, and *E. porphyphaeum*, a medium sized grey species often forming fairy rings, has been recorded, as has the white-capped *E. cephalotrichum* (as *Leptonia sericellus*, Table 3). The present survey found only four species (Table 1), of which *E. staurosporus* was the commonest. However a number of collections remained unidentified, and it is likely that more species could have been recorded given time.

Areas of even wetter grassland with *Molinia* and *Sphagnum* near Pondsburry had some different agarics. The *Sphagnum* was characterised by at least two species of *Hypholoma*, *H. elongatum* and *H. subericaeum*, brown agarics with dark lamellae and long stipes arising from within the moss. *Agrocybe paludosa*, a small toadstool with a yellow cap and orange-yellow centre and pale brown lamellae, grew on *Sphagnum* and bare peaty soil between *Molinia* clumps and was also recorded from this habitat at Pondsburry (as *Galerina paludosa*) in 1971 (Table 3).

Agarics on Dung Many agarics grow on herbivore dung, especially in the families Strophariaceae and Coprinaceae, and might be expected to be well represented on such a heavily grazed island as Lundy. Past records (Table 3) show species in the coprophilous genera *Stropharia*, *Panaeolus* and *Coprinus* have indeed been found. Unfortunately, in the present survey, the dry conditions meant that relatively few of these fungi were encountered. The handsome *Annelaria semi-ovata* (= *Panaeolus semi-ovatus*), a tall agaric with a slender stipe, pale egg-shaped cap and black lamellae, normally common on 'horse apples' in Britain, was only found twice, as was the slenderer *Panaeolus sphinctrinus*, with an inrolled cap margin. The white 'ink cap' *Coprinus stercoreus* was also found only once on horse dung. *Stropharia semi-globata*, a medium-sized agaric with a flat yellow cap and dark gills, was found only once, and the small, round-capped, brown agaric *Psilocybe coprophila*, was equally uncommon. Both are normally abundant on sheep dung in the autumn.

Agarics in Woodland Although relatively few agarics were found in the woodland and copses around the Millcombe valley and along the eastern coastal path, the records were of great interest. Some species were wood decomposer fungi growing on fallen trunks and branches. The largest was a bright orange and yellow agaric, with a thick swollen stipe, *Gymnopilus junonius*, a clump of which was found growing from the old pine stump to the north of Millcombe House (North Wood). This beautiful fungus was previously recorded for Lundy in the 1970s from the Quarries growing on or under willow (Table 3). *Collybia velutipes*, 'winter fungus', a small orange-brown slimy-capped agaric with white lamellae, was found on dead gorse (*Ulex europaeus*) behind 'Brambles'. Clumps of the aptly named 'sulphur tuft', *Hypholoma fasciculare*, were particularly common on the stumps of rhododendron in the cleared areas on the eastern coastal path. One large fruit body of *Megacollybia platyphylla*, which has a striate brown cap and widely spaced white gills, was found growing on the willow inside the Heligoland Trap at the Quarries. *Oudemansiella mucida*, the 'porcelain fungus', a glistening white agaric widely distributed on aerial dead branches of beech in the UK, was sought, and eventually found, on the only large beech (*Fagus sylvatica*) on Lundy, at Quarter Wall Copse (Hubbard, 1970). There were none of the small agarics in the genus *Mycena* normally common on wood, again due to the dry conditions, although a previous record had been made, *M. alcalina* (Table 3). The exception was one fruit body of the grey-brown *Mycena erubescens*, found on a water-soaked alder log in a spring in St Helen's Copse.

Agarics growing on the litter under trees were also affected by the dry conditions and practically none were found, even the usually ubiquitous *Collybia dryophila* (Table 3). Again, the few records were of fruit bodies growing in locally wet litter due to springs - the small brown *Flammulaster granulatus* under alder in St Helen's Copse, and the grey-brown *Alnicola suavis* under willow at the Quarries.

The larger mycorrhizal agarics, associated as symbiotic partners with the roots of trees and fruiting in late summer/early autumn in the litter, were also uncommon. In the Millcombe valley the dirty white *Russula albonigra* and the dull yellow *R.*

ochroleuca were found growing under holm oak (*Quercus ilex*) and turkey oak (*Quercus cerris*), whilst some very dried-up fruit bodies of the purple-capped *R. krombholzii* (*R. atropurpurea*) were found under the large beech at Quarter Wall Copse. It was associated with the only bolete ('tube mushroom') found in the survey, *Xerocomus spadiceus*, a brown-capped species with yellow tubes and white cap flesh, turning slowly blue on cutting. More mycorrhizal species have been identified in the past, including additional russules and boletes, together with three species in the genus *Lactarius* ('milk caps'), a *Hebeloma* species, and the mycorrhizal gasteromycete *Scleroderma citrinum* ('earth ball') (Table 3). Clearly mycorrhizals were under-recorded during our survey.

Gasteromycetales

This order of the Basidiomycota contains the puffballs, stinkhorns and their allies. On Lundy previous records have been of grassland puffballs, including the 'giant puffball', *Calvatia* (*Langermannia gigantea*) and the smaller puffballs in the genera *Bovista*, *Lycoperdon* and *Vascellum* (Table 3), the exception being *Lycoperdon pyriforme*, which grows on wood, and *Scleroderma citrinum*, a woodland soil species already noted as mycorrhizal. Table 1 shows that fresh fruit bodies of three species were found widely separated at the south end of Lundy, *Bovista plumbea*, *B. nigrescens* and *Vascellum depressum*, all in short grassland. Older blackened leather-like puffballs of *B. nigrescens* and smaller grey ones of *B. plumbea*, probably from the 2002 season, were, however, common, blowing around, or trapped in vegetation, especially in the nettles near Marisco Castle, where *B. nigrescens* was previously noted in 1995 by Parsons & Keylock. Mycelia of these fungi in grassland are indeed very persistent, so the record of the 'giant puffball', *Langermannia gigantea*, from the South West Field by Walker & Langham (1970), may make a future search of this site in early autumn worthwhile.

DISCUSSION

Numbers of fungi on Lundy

Hopefully, this brief survey will stimulate further interest in the fungi of Lundy, eventually leading to a more comprehensive list. The present total stands at around 156 species, derived by combining the 139 identifications of some ninety five species made between 1970-1995 (Table 3) with our survey total of 108 species, of which seventy five were new records (Tables 1 & 3, Figure 1). It is quite certain that the final total of species of fungi on the island should exceed that of the flowering plant species, standing at present at 517 species (Hubbard, 1997), and of the lichens, 348 species, (James *et al.*, 1996). In the UK as whole, the species total of fungi is at present

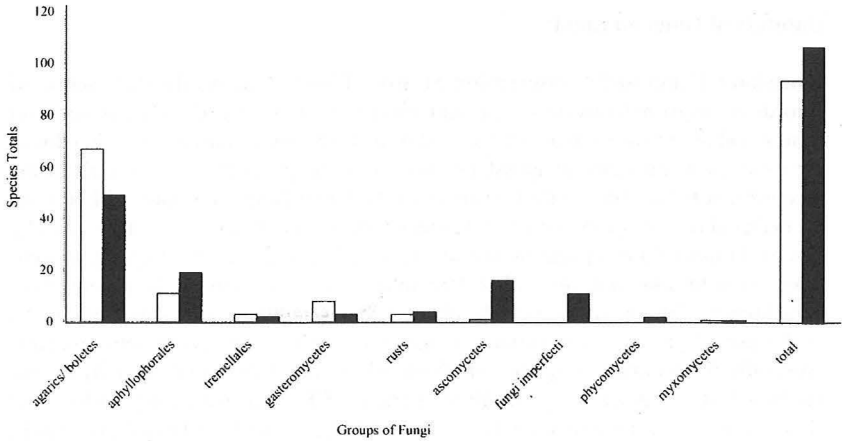


Figure 1. Species totals in major groups of fungi recorded from Lundy.

Key. White bars pre 2003; black bars, 2003 records.

14,710 (Paul Kirk Pers. Comm., 2004), so that even if only 10% of these occur on Lundy, given the limitations of vegetation types, habitats, climate and surface area on a small island, the total could be in the region of a 1000 species. County-based surveys by local fungus groups in UK are producing lists of 2-3000 species of fungi, of which around two thirds are macrofungi, for example the Warwickshire Fungus Flora (Clark, 1980). This means that, even if interested visitors to Lundy still continue to record only the larger 'mushrooms and toadstools' during their stay, there is still plenty of opportunity to find new records for the island. Diana Keast told us that the 'Blewit' (*Lepista saeva*) was routinely gathered for the table by herself and others when she lived on Lundy, but it has yet to be officially recorded.

The present list is also analysed taxonomically in Figure 1, which shows numbers of records for different groups of fungi for Lundy. The paucity of records for most groups, with the possible exception of the agarics, is underlined, especially the ascomycetes, myxomycetes, rusts, other microfungi and the myxomycetes. Not unexpectedly, many of the species in these groups are small, appear to need specialist knowledge and are not covered by the usual field guides to the larger fungi. However, texts are now available which greatly assist identification of these groups, most especially the excellent 'Microfungi on Land Plants' by Ellis & Ellis (1997), and anyone wishing to investigate these fungi would rapidly add to new records for the island.

Habitats of fungi on Lundy

Grassland Fungi and Conservation Status Figure 2 shows the distribution of records amongst habitats for the present survey and past records. The greater total from wood in our survey is an artefact and reflects the dry conditions, which reduced the usual preponderance of grassland species of the previous lists, as well as the mycorrhizal fungi. The greatest diversity of the larger fungi on Lundy will be from the main habitat, grassland, which still remains under-recorded. Grassland is especially diverse in macrofungi appearing outside the usual visitor season- in spring, March-May and in late autumn, November–December, when soil moisture levels are likely to be higher, allowing fruiting to take place. There is currently a great deal of interest in the use of grassland macrofungi as indicators of meadow ecosystem diversity, especially the numbers of species of *Hygrocybe* ('wax caps') and diversity of the families Entolomataceae ('pink-gilled agarics'), Clavariaceae ('fairy clubs') and Geoglossaceae ('earth tongues'). Boertmann (1997), in a study of Danish grasslands, found that high numbers of 'wax cap' species in grassland were correlated with very low levels of soil nitrate and phosphate, and an accompanying high diversity of plant species, while a low species diversity was found in improved grassland of low conservation value. Applying Boertmann's classification scale to Lundy, the past

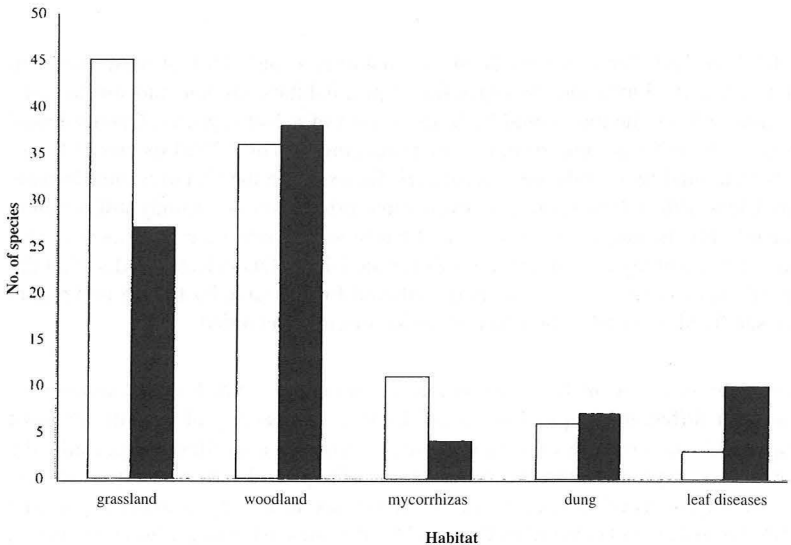


Figure 2. Distribution of records of fungi from Lundy between major habitats.

Key. White bars pre 2003; black bars, 2003 records.

records of 15 *Hygrocybe* species (Table 3) indicates that the overall island rating would be of national importance. However, it is likely that the improved enclosed grasslands, such as Lighthouse Field and Brick Field, would have a much lower *Hygrocybe* diversity than unimproved areas like Acklands Moor and the island beyond Quarter Wall. A comparative 'wax cap' survey of the island, in November/December and in April/May, would thus be of great interest. Data could be included in the current UK 'wax cap' survey being organised by Plant Life (see www.plantlife.org for more details).

Wood Decomposer Fungi and Island Biology There are considerable opportunities for the fungal ecologist on the island, especially to determine the influence of island biology on the fungi. Wood provides just one example where Lundy mycology may be different. During our survey we began to realise that a number of the wood rotting fungi we found were on gorse, a comparatively unusual host. These included: *Collybia velutipes* (Agaricales), *Stereum hirsutum*, *Polyporus squamosus*, and *Phellinus tuberculatus* (Aphylliphorales), all of which are common on broad leaved tree species on the mainland. Another example was *Hymenochaete rubiginosa*, usually on oak, but common on willow on Lundy. It is tempting to hypothesise that this may be an example of the 'founder effect' - the arrival of spores of these fungi from the mainland to an island with very few woody hosts, so that the selective pressure would be for races of the fungi able to colonise the few available woody plants, such as gorse and willow. An equally valid explanation may be that some of these fungi may have survived from the forest which once covered Lundy in the post-glacial, and was cleared by man. It is of interest to note that Hubbard (1970) considers Lundy to have been largely treeless as far back as 1274, and completely without trees by 1620. It is probable that all the trees now on Lundy have been planted or arrived as seed in the last 150 years. However, Hubbard (1970) implies that 'scrub', presumably including gorse, and willow, is native and has never been completely removed, so wood rotting fungi may have been able to persist on these alternative hosts. Studies of the population genetics of wood rotting fungi on Lundy, in comparison to mainland samples, would help to resolve this problem. There are parallels. Roy Watling (Pers. Comm.), in a study of fungi at treeless Betty Hill in northern Scotland, also concluded that tree-associated mycorrhizal fungi present in the original forest had survived the total clearance on the roots of dwarf willows, where they occur to the present day.

Unexplored Niches There is a good case for detailed specialist studies on the diversity of fungi in particular niches on Lundy. Fungi on dung must be of great interest, given the numbers of herbivores and a comparative study of the dung of horse, soay sheep, goat, rabbit and deer would be rewarding. Other examples of fungal communities to investigate might include entomogenous fungi on insects, marine fungi on submerged timbers and seaweeds, freshwater fungi in the ponds and streams, rusts and smuts on different plant species, microfungi on herbaceous stems, keratinophilic fungi on wool and feathers, to suggest but a few.

CONCLUSIONS

It is to be hoped that this brief account of our own and previous data on the fungi of Lundy will stimulate further interest in this under-recorded and beautiful group of organisms during visits to the island, in particular in the spring and late autumn. Future records, or indeed past records, sent to John Hedger, will be most welcome. They will be added to the database of Lundy fungi, as well as the national database of the British Mycological Society. Let us put Lundy on the UK fungus map.

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REFERENCES

- Anon., 1992. Fungi on Lundy, 1992. *Annual Report of the Lundy Field Society* 43, 117.
- Archer, S.A., 1971. Fungi noted in 1971. *Annual Report of the Lundy Field Society* 22, 43.
- Boertmann, D., 1997. *The genus Hygrocybe. Fungi of Northern Europe Vol. 1.* Copenhagen: Danish Mycological Society.
- Bon, M., 1987. *The mushrooms and toadstools of Britain and North-western Europe.* London: Hodder & Stoughton.
- Breitenbach, J. & Kronzlin, F. 1981. *Fungi of Switzerland, Volume 1, Ascomycetes.* Lucerne: Mycological Society of Lucerne.
- Breitenbach, J & Kronzlin, F., 1986. *Fungi of Switzerland, Volume 2, Non-gilled Fungi.* Lucerne: Mycological Society of Lucerne.
- Clark, M.C., 1980. *A fungus flora of Warwickshire.* London: Birmingham Natural History Society & The British Mycological Society.
- Courtecuisse, R. & Duhem, B., 1995. *Mushrooms & toadstools of Britain & Europe.* London: Harper-Collins.

- Dennis, R.W.G., 1978. *British Ascomycetes*. Germany: J. Kramer.
- Ellis, M.B. & Ellis, J.P., 1997. *Microfungi on land plants*. 2nd Edition. Slough: Richmond Publishing Co. Ltd.
- Hubbard, E.M., 1970. A survey of trees on Lundy. *Annual Report of the Lundy Field Society* 21, 14-19.
- Hubbard, E.M., 1997. Botanical studies. In R.A.Irving, A.J.Schofield & C.J.Webster, *Island Studies, Fifty Years of the Lundy Field Society*, 141-148 . Bideford: The Lundy Field Society.
- Ingold, C.T., 1975. Guide to aquatic Hyphomycetes. *Scientific Publication 30, Freshwater Biological Association*.
- James, P.W., Allen A. & Hilton, B., 1995. The lichen flora of Lundy. I. The Species. *Annual Report of the Lundy Field Society*, 46, 66-86.
- James, P.W., Allen, A. & Hilton, B., 1996. The lichen flora of Lundy. II. The communities. *Annual Report of the Lundy Field Society*, 47, 93-126.
- Montagu, R., 1972. Fungi on Lundy 9-12th September 1972. *Annual Report of the Lundy Field Society* 23, 59.
- Moser, M., 1983. *Keys to Agarics and Boleti* (English Translation). London: Roger Phillips.
- Noon, R.A. & Hawksworth, D.L.1972. The lichen flora of Lundy. *Annual Report of the Lundy Field Society* 23, 52-58.
- Parsons, A.J. & Keylock, J.G., 1995. Fungi on Lundy 1995. *Annual Report of the Lundy Field Society* 46, 93.
- Phillips, R., 1981. *Mushrooms and other fungi of Great Britain and Europe*. London: Pan Books.
- Walker, A.J.B. & Langham, M.S., 1970. Some tentative identifications of Lundy Fungi. *Annual Report of the Lundy Field Society* 21, 34-35.
- Walker, A.J.B., 1971. Additional fungi on Lundy May 1971. *Annual Report of the Lundy Field Society* 22, 43.
- Wilson, H. 1987., Fungi of Lundy. *Annual Report of the Lundy Field Society* 38, 50-51.