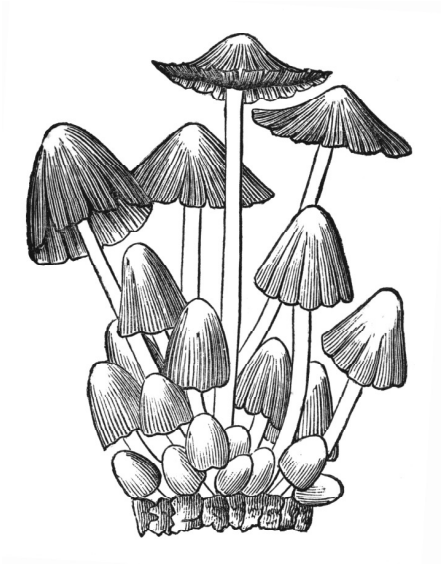

BFG

Buckinghamshire Fungus Group

Newsletter No. 11

September 2010

£3.75 to non-members

The BFG Newsletter is published annually in August or September by the Buckinghamshire Fungus Group. The group was established in 1998 with the aim of: encouraging and carrying out the recording of fungi in Buckinghamshire and elsewhere; encouraging those with an interest in fungi and assisting in expanding their knowledge; generally promoting the study and conservation of fungi and their habitats.

Secretary and Joint Recorder	**Derek Schafer**
Newsletter Editor and Joint Recorder	**Penny Cullington**
Membership Secretary	**Toni Standing**
Foray Programme Secretary	**Joanna Dodsworth**

The Group can be contacted at fungi@bucksfungusgroup.org.uk or at the addresses on the back page of the Newsletter. We have recently established an expanded web site – this is hosted through the kind assistance of bucksinfo.net and we are aiming to keep it up to date by editing it directly ourselves. Time will tell if we are up to the task.! It can be reached at: www.bucksfungusgroup.org.uk.

Membership costs £4.50 a year for a single member, £6 a year for families, and members receive a free copy of this Newsletter. No special expertise is required for membership, all are welcome, particularly beginners.

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Photo credits: AW = Alan Showler; AB = Antony Burnham; ARO = Alan Outen; DJS = Derek Schafer; KR = Kerry Robinson; NK = Nick Kelly; PC = Penny Cullington; PM = Peter Mukherjee (petermphoto.com); SW = Seth Wilde.

Cover photo: *Hygrocybe coccinea* (Scarlet Waxcap) in the icy grass at Penn Cricket Pitch, 1st December 2009. Photo PC

SHORT AND SWEET

Hello, BFG members, and welcome to this our eleventh newsletter. I'm going to keep this introduction short and sweet and cut the usual preliminary waffle as we are pushed for space to fit everything in. The basics only:

Firstly our thanks to members Kerry, Antony and Brian who have contributed articles which I'm sure you are going to enjoy. Secondly our thanks to all who have provided photos, such a valuable feature of the newsletter. No change from last year to subscriptions or insurance. Our group officers remain the same – many thanks to them. The AGM went off well as usual, but it would be nice if more members attended next year; it's not so much an AGM, more a slide show of fungi photos taken during the past year, so why not bring yours along and enjoy the tea and cakes?!

INTERNET MATTERS

The Blog, now shared with neighbouring Herts and Beds Fungi Group (HBFG) and introduced in last year's newsletter, has been taken up with very little enthusiasm by our members although is thriving with HBFG activity. Let me know if you missed out on hearing about it last year and are interested. However, if this is not for you then perhaps our recently introduced website will be? This is still in its infancy and very much a work-in-progress with much development still in the pipeline, and members Justin Long and Peter Davis have kindly undertaken to take this on. Do try it out and let us know what you think: www.bucksfungusgroup.org.uk – any comments/ suggestions/contributions gratefully received.

The BFG database will shortly be available on line for the first time, allowing you to check for previous records, foray lists etc. This facility and, indeed, the BFG database itself, is the brain child of member Nick Jarvis. Nick has also created an on-line programme for creating synoptic keys, which you can use to design your own keys. Keys designed by others are also available for you to use. In fact, if you are interested to see how this works, I have just published my Flying Pigs key (to nodulose-spored British *Inocybe* species) and recently announced in Field Mycology. The software is available at www.synoptikeys.org.uk and can also be reached via the BFG web site.

A synoptic key is one which allows you to avoid having to make choices in a fixed order (often requiring information which you do not have) and the better synoptic keys will provide an answer (or range of possible answers) from whatever information you do have. Years ago such keys were constructed using cards with holes at the edges and knitting needles (Derek has an example of one such key published in France if anyone would like to see it!). They are however ideal for using on computers and in that form are much more approachable than the traditional dichotomous key. Nick's software provides keys with drop-down lists to choose from for each character with illustrations to help and a difficult character can just be left as a "don't know". Why not visit the site and try it out.

OUR FORAY PROGRAMME

You will have already received this, but I'd like to highlight a few special things and also a few small changes in detail. Firstly a new event for the group, and also our first of the season, shared with the HBFG and to be held at Ashridge - half in Herts / half in Bucks and thus chosen for its central location, also its excellent fungi and indoor facilities. This is a foray and identification workshop day all rolled into one, but with one change since our programme was circulated: due to serious ill-health unfortunately Alan Outen will not be able to take part, but fortunately Geoffrey Kibby, field mycologist 'extraordinaire' and chief editor of Field Mycology, has agreed to come instead. Geoffrey will firstly lead our foray in the grounds, then on our return to the workroom will be guiding, tutoring and demonstrating as required as we set about identification using books, scopes, visual aids, chemicals, etc., all of which should be in good supply. This will take over the rest of the day, and there will be plenty of help on hand from other experienced members from both groups. So expect a lively and entertaining day, and if you've not had the privilege of meeting Geoffrey before, do not pass this opportunity by! His is an exceptional talent, being probably this country's most experienced field mycology teacher and with an infectious enthusiasm to go with it. This novel event is designed for all standards, but especially the less experienced. Lunch can be bought on site, or bring your own; coffee / tea will be available in the workroom. Bring your own microscope if you have one (but this certainly not essential). Date: Sun. Sept 5th; Start time: 9.30; Finish time: 3.30. No dogs. There is a nominal charge of £5 for the day, and you do need to book your place. Contact Steve Kelly at stephen.kelly@talktalk.net or 01923-268689.

Now another new event: a four-day residential foray at Derek's Forest of Dean abode, joint with the Leicestershire and Herts/Beds groups. This is a small affair, just ten places, and although untutored there will be help on hand from other participants. More details are in the foray programme. Just a couple of places left on this one, so contact Derek a.s.a.p. if you're interested.

Now a very quick plea for both specimens and helpers for our annual 'Mushroom Magic' display at the County Museum, Aylesbury on Sat. Oct. 2nd. For more information check the foray programme or contact Derek or myself.

Martyn Ainsworth is joining us again this year, this time at Cliveden on Sun. Oct 10th. He, like Geoffrey Kibby, is an outstanding mycologist, so make sure this one goes into your diary. This foray may well extend into the afternoon, and also please note No Dogs on this one.

Finally some additional information on arrangements for two forays. The meeting point for the Brush Hill foray on 17th Oct is Whiteleaf Cross Car Park at SP 822 035. The Rushmere Estate foray on Sunday Oct 31st will run all day, HBFG-style, so come for the morning or the afternoon or both. Bring lunch if you intend to stay on. Afternoon only attendees need to be at the parking spot in good time, by 1.30pm. Dogs allowed if under strict control.

Now without further ado I'll hand over to Derek for his seasonal review.

REPORT OF THE 2009/2010 SEASON

Derek Schafer

As in previous years, these reports give only a small selection of illustrative finds for each venue visited by the Group. Lists of the records for each site visit should soon be available on our web site (see Penny's news above).

As I said in last year's Newsletter, it would be really helpful if members could choose an area in which to specialise and then help out with those species. Please contact me or Penny if you want to embark on such a course!

Bernwood Forest 6 Sep 2009

Led by Alan Hills and attended by guests from the Oxford Fungus Recording Group, this was a well attended foray and produced a number of interesting finds among a list of 77 species. Gilled fungi included the deadly poisonous *Amanita phalloides* (Death Cap), eight milk caps including *Lactarius chrysorrheus* (Yellowdrop milkcap), with rapidly yellowing milk, and *Lactarius pterosporus* with distinctively ridged spores. A rather large, robust pink – spored species that we thought was a *Rhodocybe* proved to be an *Entoloma* in Section Rhodopolia but resisted more accurate naming. Among other finds, *Thelephora penicillata* was found again and the very rare *Cantharellus melanoxeros* (Blackening Chanterelle, fig.1) a vulnerable red-data list species with 13 national records was an outstanding find. *Ascomycetes* included *Helvella macropus* (Felt Saddle, fig.2) and *Otidia onotica* (Hare's Ear).

fig.1 *Cantharellus melanoxeros* (Blackening Chanterelle) Bernwood Forest 6 Sep 2009 (DJS).

fig.2. *Helvella macropus* at Bernwood Forest 6 Sep 2009 (PC)

Hog and Hollowhill Woods 13 Sep 2009

Martyn Ainsworth tutored a walk-around introduction to these two adjacent Bucks County Council sites that he had recently studied for the Council. Both sites produced a number of records of rare or less well known species. Species at Hog Wood included *Melanamphora spinifera* (according to FRDBI, last recorded in Buckinghamshire in 1947 but, as a Beech parasite, perhaps encountered more recently), *Botryobasidium candicans*, *Hyphodontia alutaria*, and *Eutypa maura*. A collection of *Ganoderma applanatum* had the galls of the fly *Agathomyia wankowiczi* on it (see fig.7). Martyn also found *Hymenochaete corrugata* (Glue Crust) and explained how it bound falling twigs of Hazel within the canopy, thus collecting its substrate before it fell to the ground to be consumed by other fungi. This fungus is also of interest in relation to Kerry's article (p.16) about fungi on fungi. The *Hymenochaete* is host to a rare and endangered *Ascomycete* (*Hypocreopsis rhododendrii*, Hazel Gloves), so far only known in the British Isles from Scotland, Ireland and, in England, from Devon and Cornwall. Other species at Hog Wood included *Aleuria aurantia* (Orange Peel Fungus, fig.11, on p.13 below).

Species at Hollowhill Wood included *Phlebia livida*, *Volvariella hypopithys* and the olive-green cup fungus, *Catinella olivacea* (fig.3).

fig.3. *Catinella olivacea* Hog & Hollowhill Woods 13 Sep 2009 (PC)

County Museum, Aylesbury Autumn Wildlife Day 3 Oct 2009

Members brought in another magnificent range of fungi for this regular autumn wildlife event at the County Museum. Many thanks to all who took part (and we hope for another successful event this year - please see Penny's plea for help on page 4, above).

Burnham Beeches 4 Oct 2009

This was a joint public foray with the site owners, the Corporation of London. Several rare fungi were found, including *Hericium coralloides* at its usual spot (a red data list species of near threatened status; see Newsletter No.9, 2008, p.36) and *Laccaria purpureobadia* with 72 national records.

Mousells Wood 11 Oct 2009

We listed some 57 species. Conditions were good and the fungi photogenic. New member Peter Mukherjee took some fine photographs including that of *Armillaria mellea* (fig.4). Perhaps I should also update readers on the *Hohenbuehelia* collected at Mousells Wood in October 2008 and reported in the last newsletter. This had been left without a definite name as I struggled with available keys. Around the same time as our newsletter appeared there was an article by Alick Henrici with a new key to *Hohenbuehelia* in Field Mycology 10(4), Oct 2009. Alick emphasises the importance of whether the metuloids stick out from the gill surface ("exserted") rather than being buried within it. This takes you to *H. atrocaerulea* but only after navigating some tricky couplets dealing with cap size and gill colour. The Funga Nordica key also leads to this species if we ignore the grey colour of the gills, which was present in air-dried but not heat dried collections. There is a further short note by Alick (with the two photographs from our newsletter) in Field Mycology 11(2) May 2010.

fig.4. *Armillaria mellea* Mousells Wood 11 Oct 2009
(PM - courtesy of petermphoto.com)

Dancersend 14 Oct 2009

This was a joint foray with the Herts & Beds Fungus Group. Despite the mid - week date, we had a good team of forayers. The list for the day was 58 species, including *Rhodotus palmatus* (Wrinkled Peach) on a fallen beech trunk (not its usual host of

Elm), *Conocybe siennophylla* (a new County record), *Ossicaulis lignatilis* and *Stemonitis herbatica.* A collection of *Mycena arcangeliana*, one of the commoner species on our forays, is shown in fig. 5.

fig.5 *Mycena arcangeliana* Dancersend 14 Oct 2009 (DJS)

<u>Stoke Common 17 Oct 2009</u>

This was the first Group foray to this site which is being managed by the Corporation of London for whom Penny is now undertaking a detailed fungal survey. A number of unusual fungi were found, including *Agaricus cupreobrunneus* (confirmed by Alan Outen) with only 70 national records, *Coprinopsis phlyctidospora* with only 15 national records (but probably less rare than the Agaricus, given that less common ink caps are not recorded by many mycologists!), *Mycena megaspora* and *Pholiota lubrica* with only 28 national records, confirmed by Alan Outen. *Lactarius helvus* (Fenugreek Milkcap), a species smelling of curry that we commonly encounter in Scotland is rare in Buckinghamshire where its habitat (sandy acid soils with conifer and birch trees) is uncommon.

<u>Margaret Holden Memorial Foray, Ashridge 18 Oct 2009</u>

This regular event, a public foray, is a joint event with the Herts & Beds Fungi Group, the National Trust and others. Ashridge is a rich site and produced many different fungi from the large and splendid *Amanita muscaria* (Fly Agaric - see last year's Newsletter No.10, p.33) to the little brown jobs such as *Galerina ampullaceocystis* on dead bracken stems. One mystery that Penny and I struggled with we eventually decided independently was *Psathyrella variata*. This is close to *Psathyrella spadicea* and both share the remarkable thick-walled gill cystidia tipped with crystals (fig.6).

fig.6. *Psathyrella variata* gill facial cystidia Ashridge 18 Oct 2009 (DJS)

Psathyrella variata **does not seem to be on the list of British species, possibly because the distinction from** ***P. spadicea*** **(bristles on the edge of the cap in** ***P. variata*****) is not universally accepted.**

Naphill Common 28 Oct 2009

This was a joint foray with the Friends of Naphill Common, who provided an enthusiastic group of forayers. The list of 51 species included 11 ***Mycena*** **species,** ***Clitocybe houghtonii*****,** ***Ganoderma applanatum*** **(Artist's Bracket), fig.7, with the fly galls again, which seem to have become quite common in our area when the fungus is found,** ***Marasmius bulliardii*** **(see Newsletter No.8, 2007, p.7) and a collection that we thought was** ***Otidea alutacea*** **(Tan Ear) but asked Kew to look at. This turns out to have somewhat smaller spores and paraphyses with granulate inclusions and Kew might describe it as a new variety – we await their decision.**

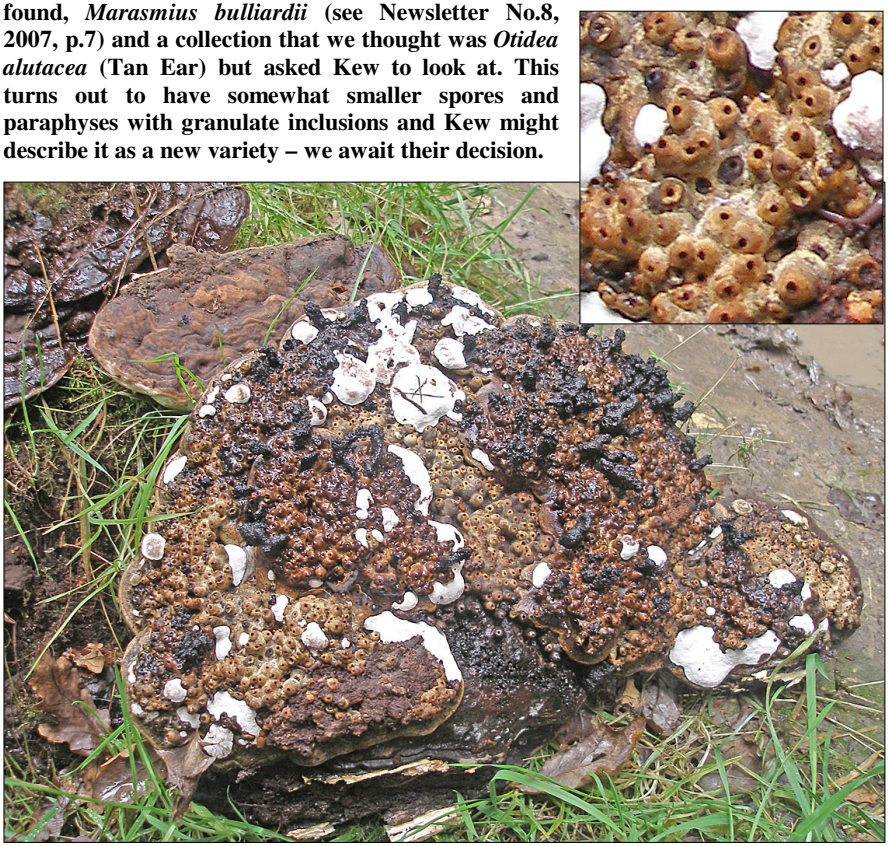


fig.7 *Ganoderma applanatum* (Artist's Bracket) with galls of the fly, *Agathomyia wankowiczi* on it (galls shown enlarged in inset photo) Naphill Common 28 Oct 2009 (PC)

Penn Waxcap Foray 29 Oct 2009

As I have said before, it is remarkable how many fungi can be found on a cold day at the end of October whilst walking the 400 yards from Penn Church to the Squirrel Pub. An example is on the front cover of this year's Newsletter. This year we also forayed in the woodland and the day produced a variety of finds, including ***Otidea***

***onotica* (Hare's Ear), *Psathyrella gracilis* and *Coprinopsis echinospora*, with distinctive warty spores under the microscope.**

Danesborough 31 Oct 2009

This foray, at a site that is often rich in fungi at the end of the autumn, produced an eclectic range of finds. Species included *Mycena metata*, *Clitocybe costata*, *Psathyrella conopilus* (Conical Brittlestem), *Clitocybe fragrans* (Fragrant Funnel), *Hebeloma mesophaeum* (Veiled Poisonpie), *Melanoleuca cognata* (Spring Cavalier) and *Conocybe siennophila*.

Little Linford Wood and Salcey Forest 1 Nov 2009

Despite the inclement weather, our small group of forayers managed to find 41 species at Little Linford Wood, including *Dendrothele acerina*, a fungus resembling white paint on damaged Field Maple, *Macrotyphula fistulosa* (Pipe Club), 9 species of *Mycena*, the distinctive *Pluteus umbrosus* (Velvet Shield), and *Psathyrella multipedata* (Clustered Brittlestem). In the afternoon we visited the corner of Salcey Forest that is in VC 24, adding another 34 records, including, on the dead stem of a nettle, the tiny but very distinctive *Crocicreas coronatum* (fig.8). This does not have, but surely deserves an English name and was a new County record (Martyn Ainsworth's record of it a month later got to the national database first and will probably take that credit officially). With 461 records elsewhere in Britain, this demonstrates the need (see p. 15 below) for a Buckinghamshire *Ascomycete* specialist.

fig.8 *Crocicreas coronatum* Salcey Forest 1 Nov 2009 (PC)

fig.9 *Crepidotus variabilis* (Variable Oysterling) found at Carpenters Wood 3 Jan 2010, although this collection is from Sherrards Park Wood in 2004 (DJS)

Carpenters Wood 3 Jan 2010

Winter forays can be discouragingly unproductive but this one provided a list of 59 species including many gilled fungi and other things of interest. The slime mould *Trichia contorta* was a first record for the Vice County (VC 24, despite the Wood being in administrative Hertfordshire). Other finds included *Ceriporiopsis gilvescens*, *Perenniporia fraxinea* on an Ash stump and *Auricularia auricular-judae* (Jelly Ear) on Beech as well as its usual Elder.

At this time of year, *Crepidotus* species such as *Crepidotus variabilis* (Variable Oysterling, fig. 9) and *Crepidotus cesatii* are common and we also found *Pleurotus cornucopiae* (Branching Oyster, fig.10) and the *Ascomycete* cup fungus, *Peziza micropus*.

Fig.10 *Pleurotus cornucopiae* (Branching Oyster) found at Carpenters Wood 3 Jan 2010, this collection from Derbyshire in 2007 (DJS)

Hockeridge Wood 7 Feb 2010

A winter day produced a list of 36 species, many of them typical of the time of year such as *Byssomerulius corium* (Netted Crust) and *Exidia thuretiana* (White Brain, see BFG Newsletter No.8, 2007, p.17) along with dots on sticks and dots on dots on sticks like *Polydesmia pruinosa* on *Hypoxylon fragiforme* (Beech Woodwart, see article by Kerry Robinson below, p.14). Among few gilled fungi, the most remarkable find was *Cystoderma jasonis*. This is distinguished from the much more

fig.11 Tiny rectangular arthrospores among tissue from the cap of *Cystoderma jasonis* Hockeridge Wood 7 Feb 2010 (PC)

common *Cystoderma amianthinum* (Earthy Powdercap) by, among other things, the presence of arthrospores – asexual spores formed from hyphae that previously made up the tissue of the fungus (see fig.11). This is a well known fungus North and West of our region (with a few records in Norfolk) but seems to be almost absent from the Home Counties, with one previous record from Kent.

<u>Other interesting finds in the County</u>

In February Hillary Phillips reported finding the unusual *Geastrum quadrifidum* (Rayed Earthstar) (fig.12) growing together with the much commoner *Geastrum triplex* (Collared Earthstar) in Tingewick Woods. The material was kindly checked by Steve Kelly and is a first for the County.

fig.12 *Geastrum quadrifidum* (Rayed Earthstar)
Tingewick Woods 20 Feb 2010 (NK)

In May this year Penny was puzzled by a patch of tiny yellow-orange cups, not more than 5mm across, growing on soil in heathland at Stoke Common (fig.13a). To her surprise the distinctive ornamented spores revealed these to be nothing more interesting than very small specimens of *Aleuria aurantia* (Orange Peel Fungus). Fig.13b shows more typical specimens from Hog Wood on 13 Sep. On further investigation she read that a drop of Melzers solution added to a slide preparation turns the paraphyses (where most of the colour originates) a dark dirty green

(fig.13c). She took this one stage further and discovered this works just as well dropped onto the fresh caps – a useful macro identification check worth noting.

fig.13a Small fruitbodies of *Aleuria aurantia* Stoke Common 11 May 2009 (PC)

fig. 13b *Aleuria aurantia*
Hog Wood 13 Sep 2009 (PC)

fig.13c *Aleuria aurantia* asci and paraphyses in Melzers iodine under the microscope (PC)

I am (I will be kind on myself and say occasionally) prone to embarrassing errors and omissions. One this year was when Martyn Ainsworth extolled attendees at the Buckinghamshire Recorders meeting to go out and look for a range of fungal species that he explained were extinct in the County. One, *Hericium erinaceus* (Bearded Tooth), prompted a reminder afterwards from member Dr Alan Showler that he had recorded this from Naphill Common on a number of occasions in the past and told me about it. Alan's slide of a record in November 1997 (fig.14, scanned by me) is displayed with apologies! As a biodiversity action plan (BAP) species I think this raises an interesting issue from the point of view of conservation. It is also found in the USA, where it is grown commercially and the spawn sold for growing on wood. The spawn is also now being sold in Britain. So the issue is whether we should try to find ways (DNA-based, presumably) to distinguish material of British origin and perhaps start producing spawn from it for growing in Britain instead of diluting the native fungus with US material?

fig.14 *Hericium erinaceus* Naphill Common 1997 (AS)

fig.15 *Stropharia rugosoannulata* Northants. June 2010 (SW)

In June this year, member Seth Wilde sent me photographs of a large Stropharia (fig.15) growing on bark chippings/soil in a neighbour's garden. This seems to be *Stropharia rugosoannulata*, so far a rare fungus in Britain and new to Northhamptonshire (not known from Buckinghamshire either). Just last week (Aug. 12th) Penny found *Russula melitodes* (fig.16) in Hodgemoor Woods, a first for the County. This is superficially not unlike *Russula atropurpurea* but with deep orange gills, and appears to be the southern counterpart of *R. integra* (= *polychroma*) – a Scottish species found under pine. This one, however, has a preference for oak, hornbeam and birch, all in abundance at Hodgemoor.

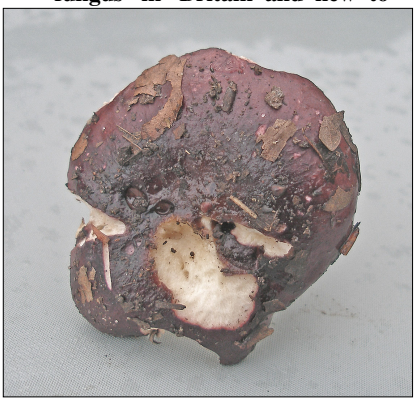


fig.16 *Russula melitodes* Hodgemoor Woods 12 Aug 2010 (PC)

FUNGI GROWING ON OTHER FUNGI Part 2 - Introduction

Penny Cullington

Whilst writing my piece on this topic last year I soon discovered what a vast subject I had undertaken, and that I would only be able to cover a very small fraction – just the *Basidiomycetes* (a Class of fungi that includes the mushrooms and toadstools) involved. However, we are lucky enough to have a member who is a real expert in *Ascomycetes* (cup fungi and the like) and all things minuscule. So at my request Kerry Robinson kindly agreed to provide an article covering a few of the hundred or so ascos (yes, really that many) which grow on other fungi – ones that we might well expect to find locally. As her local stamping ground is mid-Herts she sadly hardly ever has the time to foray with us other than at bordering sites such as Ashridge, Dancersend or Carpenters Wood. Consequently although Herts has vast numbers of ascomycete records, with a good smattering new to Britain, not so for Bucks! Of the 11 species she covers below, only 4 have between 25 and 40 records in our database, 2 have only 12 records, 3 have just 1 or 2, and 3 have none at all! This is not due to their rarity as you might think (although only one of them boasts an English name), but purely reflects the shameful lack of expertise in this admittedly specialist field amongst us regular Bucks forayers: we could and should do better! Derek has indeed suggested in past issues that there is a real opening for someone with an interest in those little things we pick up and examine with a x10 lens when foraying (but usually can't identify either then or in the lab afterwards!). Could this expert in the making be you?! (If so, BFG funds might even be forthcoming to provide some specialist books to get you started.)

Kerry's article below is a good introduction to the world of ascos, and it is particularly useful to have such good illustrations to give a helping hand. She includes her own spore drawings, and there are also macro-photos for all but 3 of the species coming from a mix of sources. This is particularly valuable as none of these species are covered in popular field guides, and only 3 appear in the specialist asco volume of the *Fungi of Switzerland* series. I'd particularly like to thank Alan Outen for sharing with us his photos of not only the rarer species in Kerry's article – needing much skill with such tiny subjects - but also for providing photos for several other articles.

As some of us may not be that familiar with *Ascomycete* jargon, I've put together a user-friendly glossary of some technical terms used below.

AGARICS	**The mushrooms and toadstools, i.e. the gilled fungi.**
ALLANTOID	**Shaped like a sausage, curved in the middle with rounded ends.**
ANAMORPH	**A distinct asexual state of a fungus, often with a separate Latin name, although when the "perfect" or sexual state is known, its name is now used for both.**
ASCOMYCETE	**A member of the class Ascomycetes, in the Phylum Ascomycota, the largest in the Kingdom Fungi, and characterised by having (asco)spores dispersed from an ascus.**
ASCOSPORES	**Spores formed inside the ascus of an *Ascomycete* (when spores are referred to without the prefix, these are generally what is meant).**

ASCUS (plural ASCI) A sac-like cell, in most cases in the form of a long tube, containing typically eight (asco)spores.

BASIDIOMYCETE A member of the Class Basidiomycetes, in the Phylum Basidiomycota, with sexual (basidio)spores formed on the outside of a cell known as a basidium, typically four per basidium. This includes mushrooms, toadstools, brackets, etc.

CITRIFORM Shaped like a lemon.

CONIDIA Asexual spores formed by the anomorph state of a fungus.

ERUMPENT Bursting or breaking through the substrate.

FUSIFORM Shaped like a spindle, wider in the middle and tapering at both ends.

GUTTULES Blobs of oil-like droplets contained within a spore.

HYPHAE The microscopic filaments or threads which form the fungal organism both within the substrate and from which the fruitbody is made.

HYPHAL WEB A mesh or mat of hyphae which fixes the fruitbody to its substrate.

KOH Potassium hydroxide solution which effects a colour change on parts of certain fungi, thus useful in identification.

OSTIOLE A minute pimple on the surface of a fruitbody having a tiny hole through which spores are dispersed.

PERITHECIA Subglobose or flask-shaped fruitbodies with ostioles.

PULVINATE Puffy, shaped like a cushion.

PYRENOMYCETE A member of the Class Pyrenomycetes in the Phylum Ascomycota having perithecia, often black, hard and crusty.

PYRIFORM Shaped like a pear.

SUBICULUM A mesh- or crust-like growth on the underside of a fruit-body.

SUBSTRATE The material (i.e. soil, wood etc) in which a fungus is growing.

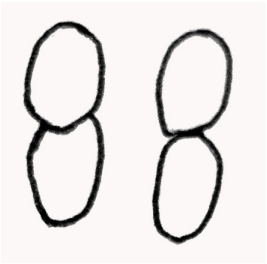
TWO FOR THE PRICE OF ONE

Kerry Robinson

In last year's Newsletter Penny wrote of some larger fungi growing on other fungi. All these were conspicuous species that cannot be missed; but not so for those I am about to introduce you to – some of the less obvious *Ascomycetes*, where a hand lens together with a little knowledge is needed to help you hunt them down.

Most forayers will recognise *Piptoporus betulinus* (Birch Polypore), but on the underside of old or fallen brackets of this species there are often crusty, pulvinate cushions of a whitish to dirty yellow colour. This is *Hypocrea pulvinata* (Ochre Cushion, fig 17), and with a hand lens the surface is shown to have a series of dotted ostioles through which spores are released. Microscopically it is interesting in having asci where the 8 spores within ultimately subdivide into 16 (fig.18). Other old decaying brackets and polypores are also worth looking at as a source of fungi growing on other fungi, and one common species you are likely to encounter in this way is the parasitic *Hypomyces aurantius* (fig 19). This produces slightly pyriform perithecia of a vivid orange colour and seated on a dense hyphal ochraceous web. The perithecia turn purple in KOH, and the spores are fusiform and distinctively ornamented.

fig.17 *Hypocrea pulvinata* (PC)
(spores below, KR)



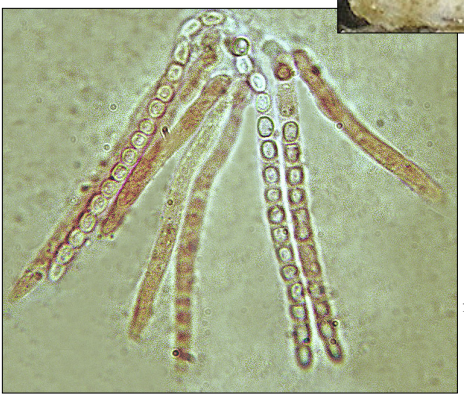


fig.18 *Hypocrea pulvinata* asci showing spores subdivided into 16 per ascus (PC)

A little care should be taken in identifying this species because *Nectria peziza* (fig.20) also grows on rotting polypores and has bright orange perithecia. However, the lack of colour change with KOH together with the very different spores under the scope will help to separate them easily.

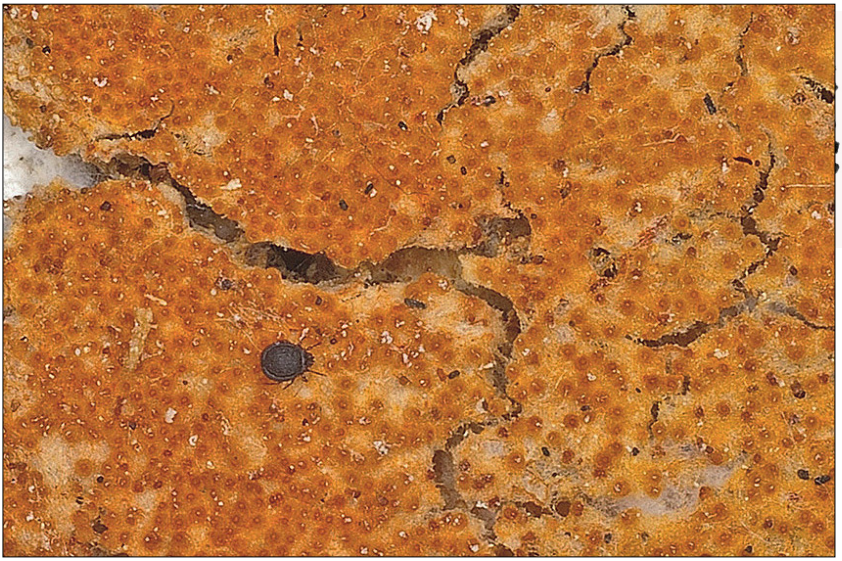


fig.19 *Hypomyces aurantius* (above, KR) fig.20 *Nectria peziza* (below, ARO) Spores insets (KR)

As is the case with most *Ascomycetes,* members of the genus *Hypomyces* have an immature anamorph state, this being entirely different in appearance and containing

conidia (asexual spores) which bear no resemblance to the true ascospores found in the mature state. This anamorph state often has a totally different name due to the fact that in many instances both states of the fungus were first discovered separately and the biological link between the two was not realised until relatively recent times. The anamorph of *H. aurantius* is called *Cladobotryum varium* and is very common.

Another *Hypomyces* species encountered on brackets is *H. rosellus* (fig 21). This starts off with a whitish subiculum, soon turning rose pink and finally producing vivid purple perithecia. Its spores (not shown here) are very similar to those of *H. aurantius* above. I don't find this with ripe perithecia too often, but when I do it is always on *Byssomerulius corium* (Netted Crust). The anamorph state of this fungus, *Cladobotryum dendroides*, is also very common.

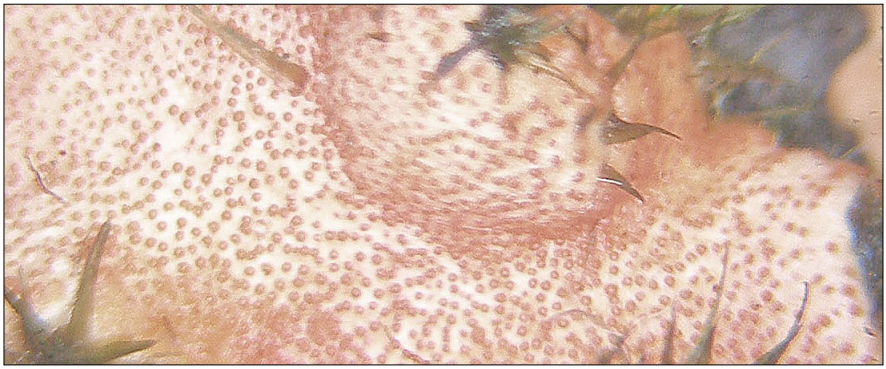


fig. 21 *Hypomyces rosellus* - above: pale rose pink stage (PC); below: final stage (KR)

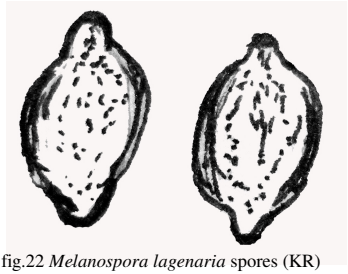


fig.22 *Melanospora lagenaria* spores (KR)

Two rarer finds now, again on old brackets, the first of which is *Melanospora lagenaria* (fig.22) with its long slender black "beaks" breaking through the surface of the decaying bracket. If you carefully dissect around the base of the "beak" you will see that it arises from flask-shaped perithecia. Within this is a greyish jelly which, when mounted under the microscope, shows the asci with their citriform spores.

Secondly *Cistella stereicola*, (fig 23) a tiny cup fungus, similar to a stalkless *Lachnum virgineum* but with whitish yellow discs under 0.5mm in diameter and short hairs 10-15 microns long. It grows on the underside of *Stereum* brackets. I have only collected this once, in February 1999 in a local wood at Sandon, Herts. Obviously one of the rarer finds.

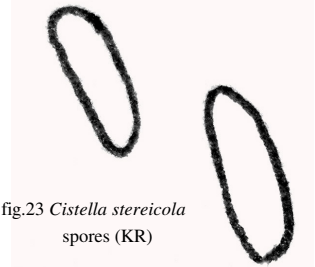


fig.23 *Cistella stereicola* spores (KR)

Leaving the world of brackets, another good host is the *Ascomycete* genus *Diatrype*. If you are familiar with the wide-spreading black crust of *Diatrype stigma* (Common Tarcrust) three very common species grow on its surface. Most noticeable are the bright sulphur yellow cups of *Bisporella sulfurina* (fig.24) which will also grow on many other *Pyrenomycetes*. This is not to be confused with the even more common yolk yellow *B. citrina* (Lemon Disco).

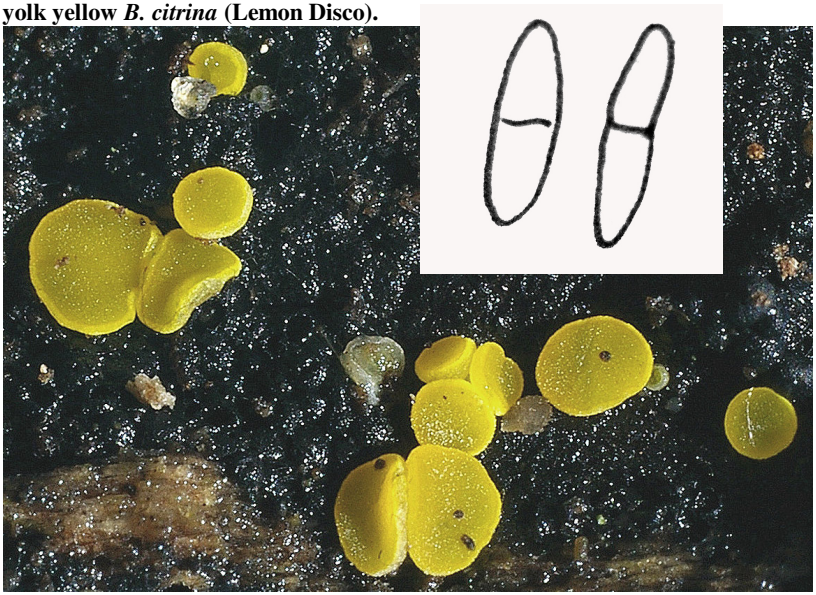
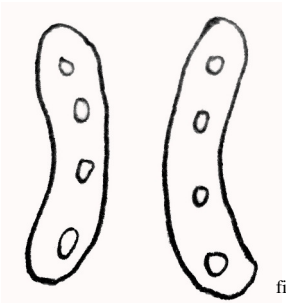


fig.24 *Bisporella sulfurina* on *Diatrype stigma* (*Bisporella* spores inset) (KR)



Another equally common species to be found on *D. stigma* is *Polydesmia pruinosa* with its tiny white stalkless saucer-shaped discs. Under the microscope it has large kidney-shaped spores with guttules and measuring up to 20 microns long (fig 25). As is true of many *Ascomycetes*, tiny fruit-bodies have surprisingly large spores, contrary to agarics which usually have much smaller spores.

fig.25 *Polydesmia pruinosa* spores (KR)

A closer look is needed for this next one, the third using *Diatrype* as host and often growing alongside *Polydesmia pruinosa*. This is *Nectria episphaeria* (fig.26). Much smaller than the common and widespread *N. cinnabarina* (Coral Spot), *N. episphaeria* has bright red perithecia scattered like little droplets over the surface of its host; as it dries these perithecia collapse.

fig.26 *Nectria episphaeria* spores (KR)

This leads us on to several further *Nectria* species which grow on other fungi. One which crops up fairly regularly during the winter months is *Nectria magnusiana* (fig.27). To find this you need to locate a recently fallen or cut Silver Birch branch, on which grows the very common black erumpent *Pyrenomycete*, *Diatrypella favacea*. This splits the bark back exposing its black perithecia, and on these grow the bright orange clustered perithecia of *Nectria magnusiana*. The entire surface of the *Diatrypella* can be covered, making it stand out against the white bark of the Birch. Its anamorph state is called *Fusarium epistroma* which has distinctive allantoid conidia.

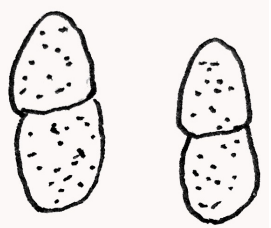


fig.27 *Nectria magnusiana* growing on erumpent *Diatrypella favacea* perithecia (ARO). Spores of the *Nectria* inset (KR)

Our next more elusive *Nectria* grows on *Leptosphaeria acuta* (Nettle Rash, fig.28), the black teardrop-like fruit-bodies of which cover old nettle stems particularly around the base. Growing amongst these black "tears" are the tiny red pyriforme perithecia of *Nectria leptosphaeriae* (spores only shown, fig. 29). With a hand lens you can see each of these perithecia seated on a small mat of white anchoring hyphae. This *Nectria*

has an anamorph called *Fusarium sphaeriae* which looks like a greyish white jelly growing on and around the *Leptosphaeria*.

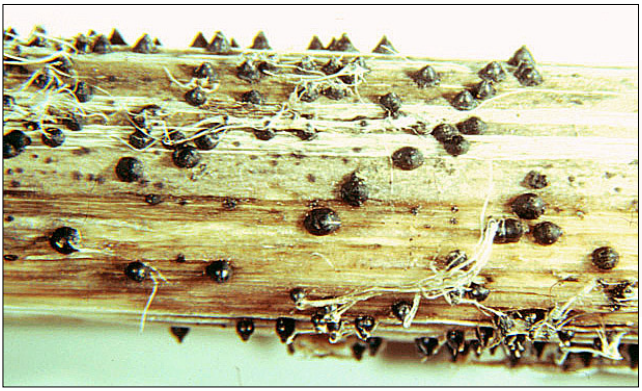


fig.28 *Leptosphaeria acuta* fruitbodies (DJS).

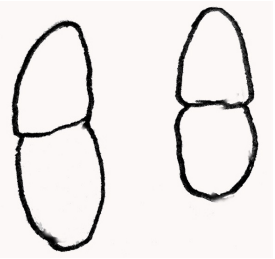


fig.29 *Nectria leptosphaeriae* spores (KR)

I have already mentioned *Nectria peziza* (fig 20) with its orange fruit-bodies found on old polypores, this will also grow on soft well-rotted wood and moss. Ellis & Ellis in their book *Microfungi on miscellaneous substrates* list nine species of *Nectria* associated with other fungi, some rare or perhaps overlooked. So there is always plenty of recording to be done, and lots to look out for.

I have only touched the surface of microfungi on other fungi, but hope it will encourage you to search more thoroughly and enjoy the unexpected delight in collecting something you didn't know was there.

THE GOLDEN GILLED BOLETE

Antony Burnham

Last summer in the Royal Botanic Gardens, Kew, I collected *Phylloporus pelletieri* (fig.30) which is a gilled fungus that, like *Paxillus* (the Rollrims), is genetically very close to the boletes. In fact *Phylloporus* is so close that some authors include its species in *Xerocomus*, and hence many keys to that genus begin rather like this one in Field Mycology 9(3):

"1. Hymenophore (spore-bearing surface) formed of soft, blunt yellow gills with prominent cross veins…… *Xerocomus* (= *Phylloporus*) *pelletieri*

- Hymenophore of typical boletoid tubes and pores…..*go to Synoptic key*"

But why would you ever try to use a bolete key for something that is gilled? Certainly from above it looks exactly like a *Xerocomus*, having a somewhat felty cap texture, which is not something seen in many other genera. Indeed, when I picked it up I was only doing so to check which of the common boletes it was - which goes to show it is always worth checking your finds! I recognised it instantly but only because I had heard about it before - I'm not sure how easily it would key out, although it does also

fig.30 *Phylloporus pelletieri* (AB)

have typical boletoid spores (fusoid and more than 2 times as long as they are wide) so perhaps that would also have helped. But I am presenting it here because it is so distinctive yet its placing with the true boletes might make it almost impossible for a beginner to locate in a book. There are a few records of this from both Bucks and Herts, and it is probably most frequent in south-east England.

fig.31 *Tricholomopsis rutilans* (Plums and Custard, DJS)

[Note from editor:-

I first came across this fairly rare species in Bradenham Woods in the south of the county back in 1999, and certainly experienced the beginner's difficulty Antony comments upon in that the last place one would think of looking to identify it would be amongst the boletes! In fact I remember wondering on collection if it could possibly be close to the common conifer associate *Tricholomopsis rutilans* (Plums and Custard, fig.31) which is also a chunky mushroom with a similarly reddish tinge to the cap and bright yellow gills, but (a) my mushroom was growing with deciduous trees, and (b) I couldn't understand why its spores were totally the wrong colour and shape for that genus. So I was stumped at the time and took it over to Derek, who on recognizing the spores as bolete-like was able to put a name to it straight away.

At the beginning of his article Antony mentions that *Paxillus* is a further genus closely related to the boletes but with gills instead of pores (in fact he tells me that the common *P. involutus* (Brown Rollrim) was once known as *P. paradoxus*, this name

possibly (?) alluding to its confusing and bizarre similarity to a bolete when viewed purely from above). The gills in *Phylloporus* have some cross-veining, presumably demonstrating a transitional stage between pores and gills, but not so in *Paxillus*. There is, however, a useful field character which does indeed show the link between both *Phylloporus*, *Paxillus* and the boletes: if you turn a specimen over and run your thumb from the margin inwards towards the stipe the gills will readily separate from the flesh beneath, as is also the case with the pores in a bolete. (This can be a useful check if one comes across a really large mature specimen of Roll-rim where the give-away inrolled margin has completely opened out, thus causing possible confusion with maybe a *Clitocybe* (re the shape) or even a *Cortinarius* (re the colour).) If you try the flesh separation test out on a range of different genera it soon becomes clear that this character is not present in other mushrooms.

SPECIES GROWING WITH *HELIANTHEMUM*

Penny Cullington

It has been recognised for quite a few years now that some ectomycorrhizal species of mushroom (those which grow in association with many species of forest tree) also have the Common Rockrose, *Helianthemum nummularium*, (fig 32) as host / partner as well as their normally recognised tree associate(s). This plant with its pretty bright yellow flowers is a common species of chalk downland where it often forms thick tightly woven dark green mats, and the genus is perhaps even better known in its many multi-coloured cultivated forms. It certainly seems to us surprising that this almost prostrate little shrubby plant should be singled out in this way by some fungi as an alternative to, say, a mature Pine, Beech or Oak, but what do we humans know about the requirements of a particular fungus? All we can do is observe and wonder: it would appear that the humble Rockrose must have some property in common with the much larger native trees which these fungi recognise and can tap into in the same way. Although small, this plant is in fact remarkably woody, which may have something to do with it.

fig.32 *Helianthemum nummularium* (Common Rockrose) (PC)

Chalk downland is easily accessible in the south of the county, where I live, and I first became aware of this unexpected plant - fungus partnership over ten years ago when, on a BFG foray at Coombe Hill, we found what we could only surmise was *Tricholoma sulphureum* (Sulphur Knight) growing well away from any trees on the open Chiltern escarpment. The area was a mass of large ant hills and covered in Rockrose, and we could only guess that the many fruitbodies – which did look a bit different from normal, lacking the bright yellow gills and with a rather washed out cap also a bit brown in places, but having the unmistakable coalgas tar smell – had

just faded due to the open habitat in full sun. However, the lack of any host tree remained a mystery.

Next year it fruited there again together with a mystery *Cortinarius*, both species in considerable quantities, also a *Lactarius* and an *Inocybe*. This was now becoming an intriguing puzzle. Having just acquired a specialist *Tricholoma* book I discovered there were a couple of others within the genus which also had this distinctive but decidedly unpleasant smell, but again the habitat was a stumbling block: one always associated with *Dryas octopetala* (Mountain Avens) or *Salix reticulata* (Net-leaved Willow) - both being plants of the Scottish highlands, and the other with Pine! There was obviously no likelihood of the mountain plants occurring here, but maybe there had once been Pine on the site? Some research, however, (even probing the anthills with a long metal kebab skewer to check they weren't old tree stumps!) proved negative as I had suspected it would. So the mystery continued until an article in the just recently launched magazine Field Mycology caught my eye.

In volume 2(1) Jan 2001 there was an article on Fungi in the Burren, a well-known area of limestone pavement in S. Ireland, where many species normally mycorrhizal with trees had been recorded associating with Mountain Avens, here growing only just above sea level. I became particularly interested when it mentioned the fact that there was also *Helianthemum* on the site and it was thought possible that some of the species might be using this as host. Here at last was the first evidence I'd come across of the existence of fungi growing mycorrhizally with Rockrose, although checking back I found I'd missed references to this phenomenon in Alick Henrici's regular "Notes and Records" article in F.M. vol 1 (3) and (4) 2000, where he commented on *Boletus luridus* as a species known to do just this. Moreover in Alick's next piece in vol 2(2) he reported that it was in fact the much respected mycologist Roy Watling who made the first published reference to *Helianthemum nummularium* as a mycorrhizal host back in 1988 in his Presidential Address to the BMS, where he had urged that further investigation should be made into this intriguing topic. It appears, however, that this must have fallen on deaf ears at the time because there seems to have been no further illumination on the subject for another ten years or so.

Anyway, by 2003 things had moved on apace resulting in Alick's article (vol 4(1)) containing a list of some ten gilled fungi now known to associate with Rockrose and referring to records from two sites in the Derbyshire peaks as well as our Bucks site, Coombe Hill. My troublesome *Tricholoma* which had first aroused my interest turned out to be *T. sulphureum* var. *hemisulphureum,* now referred to by some as simply *T. hemisulphureum*; the *Cortinarius* I'd found growing with it was *C. epsomiensis*, so named because of its discovery way back in 1958(!) on the Epsom Downs although at the time with no mention of its host. This species has now been absorbed into *C. anomalus* (Variable Webcap) but may well prove to be distinct. Also listed were *Lactarius evosmus* with its distinctive smell of apple, and *Inocybe obscurobadia*, so at last all my four mystery species from Coombe Hill had names and also an explanation as to how they were growing there despite the fact that both the *Lactarius* and the *Inocybe* are traditionally known to be species of deciduous woodland.

This is, however, far from being the end of the story, because since then many more sites where fungi are known to be growing with Rockrose have come to light, moreover the list of species continues to grow, with some as yet to be identified.

Coombe Hill is by no means unique in the Chilterns in possessing this interesting habitat and fungal association, but just happens to be the site where we first stumbled upon it. If you'd like to see fungi really growing in profusion with Rockrose, then read on!

WATLINGTON HILL

Penny Cullington

Paul and I first discovered this stunning National Trust S.S.S.I. site six years ago when looking for pastures new to combine birding, fungi-hunting and dog-walking – we were not disappointed: it fitted the bill on all fronts, and more. Lying a few miles south of the M40 between Junctions 5 and 6, and about eight miles due west of High Wycombe as the crow (or rather the red kite) flies, it provides everything anyone with an interest in natural history could ask for. There is open mixed woodland typical of this area with mature beech and a small larch plantation; this then opens out into one of the best bits of chalk downland I've come across in the Chilterns, with stunning panoramic views over the Oxfordshire Plain and down to the Thames valley. There's thorn scrub and Gorse dotted about, with a large stand of old Yew, but it's mainly open with short grass almost swamped by the wealth of flora typical of this habitat, and of course simply quantities of *Helianthemum* (Rockrose). It's hardly surprising that butterflies abound here as well. You can wander at will off the main path which leads gently downhill and west to Watlington village, and if it's fungi you're after then aim to get onto the south-facing escarpment which is just covered in fungi if you pick a good time, but don't forget to enjoy the red kites diplaying just overhead (see fig.46 on back page).

There is a real "Wow!" factor about this place, and it's difficult to know where to start with regard to the fungi you can expect to see, but I'll have a try and hopefully whet your appetite. Take the main path out of the car park (between the N.T. information boards), this leads you straight past an area of Larch on your right where from mid October onwards you are likely to find the uncommon but conspicuous yellow *Hygrophorus lucorum*

fig.28 *Hygrophorus lucorum* (Larch Woodwax)
24 Oct 2007 Watlington Hill (PC)

(Larch Woodwax, fig.28) in some quantity – I've never seen it in abundance like this anywhere else. Continue along this path and after a few minutes go through a kissing gate as the vista gradually opens up in front of you. You're now on a grassy path and need to start looking for waxcaps, fairy clubs and other grassland species – I've so far found 11 waxcap species here, mostly the common ones but also *Hygrocybe colemanniana* and *H. fornicata*. (We've also found the beautiful *Lepiota grangei* (Green Dapperling) and stinking *Cystolepiota bucknalii* (Lilac Dapperling) together with other small *Lepiota* species growing on the left here, although the Hawthorn and scrub they were beneath has now been cleared.) Also in this area look out for *Tremella mesenterica* (Yellow Brain), a bright orange jelly fungus growing on the Gorse stems; this is normally found on deciduous branches, Oak in particular, but is often found on Gorse. After a second rustic bench the ground starts sloping away on your right with the brow of the hill just to your left. This is the best area for *Entoloma bloxamii* (Big Blue Pinkgill, fig.29), an uncommon and beautiful species

fig.29 *Entoloma bloxamii* (Big Blue Pinkgill) Watlington Hill 11 Nov 2004 (PC)

which can be abundant here, often growing in rings or clusters, and one of the few members of this genus one can recognise with some degree of safety in the field due to its chunky stance (cap to 6cms or more) and deep almost navy blue cap contrasting strongly with the pink gills. (Other dark blue *Entolomas*, several of which can also be found on site, are not only considerably smaller and more delicate but also considerably harder to identify!) There's another *Entoloma* to look out for in this area which is very distinctive, however, due to its greeny yellow tints and extraordinary smell: this is *Entoloma incanum* (Mousepee Pinkgill, fig.30), a small species with cap

usually no larger than 3cm. When you handle it you'll find that after a few seconds its yellow-green stipe stains bright turquoise from the coloured juice;

fig.30 *Entoloma incanum* (Mousepee Pinkgill) this specimen phoyographed in wales, 2004 (PC)

its extraordinary smell is described as of strong cheese, sweat or mice. If you kept mice as a child as I did, then you will remember the smell of the cage when it needed cleaning out – it's absolutely spot on!

Before continuing west along the main path, you can head left and over the brow of the hill into one of the many spectacular Rockrose "carpets". First there's the odd Birch and then a big clump of Yew over to your right as you head down the south-facing slope on the other side. Here I have seen literally hundreds of *Lactarius evosmus* (fig.31), *Tricholoma hemisulphureum* (fig.32) and *Cortinarius epsomiensis* (fig.33), also the purple stemmed *C. calochrous* var. *haasii* (fig.34), *C. croceus* (fig.35), and several others of that genus which remain unnamed. Some of the fifteen *Inocybe* species I've now recorded with *Helianthemum* from this site may well be here, together with some unnamed *Hebeloma* species amongst other things. *Lycoperdon molle* is around also, being clearly different from the two more familiar woodland species. All these fungi are growing too far away from any trees to be forming any possible arboreal mycorrhizal association, (Yew is not known as a mycorrhizal host), but the Rockrose is clearly filling this niche and judging from the astonishing fungal activity here is making a very good job of it.

There are two more specialities growing with the Rockrose which you should keep an eye out for, and the best place to locate them is by now making your way westwards from this south-facing slope through the clump of Yews – there is a sort of path about half way down the clump – to yet another open area covered in Rockrose with scrub

fig.31 *Lactarius evosmus* Watlington Hill 18 Oct 2007 (PC)

fig.32 *Tricholoma hemisulphureum*
Watlington Hill 23 Oct 2006 (PC)

fig.33 *Cortinarius epsomiensis* Coombe Hill 14 Oct 2004 (PC)

above to your right and the odd Hawthorn dotted about. This is the best spot for a largish *Amanita* (fig. 36) which when I first encountered it in '06 I thought was *A. vaginata* due to the lack of ring, the type of volva and the beige-grey cap, although why it should have been growing there in numbers was a complete mystery as there

fig.34 *Cortinarius calochrous* var. *haasii* Watlington Hill 18 Oct 2007 (PC)

fig. 35 *Cortinarius croceus* Watlington Hill 11 Nov 2004 (PC)

fig.36 *Amanita sp.* (close to *vaginata*)
Watlington Hill11 Sep 2008 (PC)

was no *Amanita* known to associate with Rockrose that I knew of at that time. It fruited again the next year, and again last year in September when I took a slightly sceptical Martyn Ainsworth to see for himself this display of mycorrhizal associates with Rockrose. This *Amanita* rang a bell with Martyn as he'd recently been in touch with the Italian mycologist Marco Contu (author of the key to *Amanita* section *vaginatae* published in Field Mycology 4(4)). Marco was apparently working on two recently discovered species of *A.* section *vaginatae*, one grey and one more brownish, growing with *Cistus* and *Helianthemum* in very similar habitat in Italy. Keen to get to the bottom of this mystery species, I dried a specimen and sent it to him together with a photo. He was delighted to find that we were also finding these species in Britain, having recently received similar material from the Derbyshire Peaks thus further confirming the mycorrhizal association. He was working on the likelihood that one of the species was closely related to *A. lividopallescens* and the other to *A. vaginata* but thought that both would turn out to be distinct. Which of the two our Watlington Hill *Amanita* was is still not clear because when young it shows distinctly beige tinges whereas when mature it become greyer; indeed I do have doubts that there are two different species here, but the jury is still out, and I shall certainly be sending him more when it fruits this year. Incidentally, Martyn and I came across *A. citrina* also associating with Rockrose on our visit – that really was a surprise.

As chance would have it, a few weeks after all this I was delighted to read in the latest issue of FM 8(4) a further article on this topic entitled "*Helianthemum* grasslands of the Peak District and their possible mycorrhizal associates" written by Neil Barden, who I'd met on the BMS Derbyshire Upland foray a couple of years before. Neil had unearthed many earlier papers on the subject which shed further light, and he also included some excellent photos. To cap it all (no pun intended!) there on the back cover of FM was his photo of "An *Amanita* species belonging to the subgenus *Amanitopsis*. It was found growing with *Helianthemum* in the Peak District" – it was the spitting image of our Watlington Hill species.

One further species you might keep an eye open for in this same area is *Boletus luridus* (Lurid Bolete) (fig. 37), although I've only found single specimens in the last three years and suspect that it may well fruit in more profusion earlier in the season as do many of this genus. However, my visit in mid-August this year produced not this species but to my surprise *Boletus radicans*, not as yet known with this host, I think. *B. luridus* has in fact been known as a Rockrose associate together with the much rarer *B. satanus* for a considerable time, so the challenge now is to find *B. satanus* here as well!

For more information on the site I suggest you check the National Trust website. I've not forayed the smallish woodland area at the top of the hill very much as we're always keen to make straight for the escarpment, and on our return my basket is already laden with collecting pots bulging and more than enough material to keep me busy for hours. However, on one occasion I had a quick look round and was rewarded with two interesting *Hygrophorus* species: *H. unicolor* (fig.38) and *H. arbustivus* (fig.39), the second being a Red Data List species with only about 50 previous national records. I reckon this is enough evidence to show that the woodland is also well worth further mycological exploration.

We have in fact included this site in our foray programme for the first time this autumn, although it's just over the border into Oxfordshire (more's the pity!). The relatively early date, Sept 19th, was chosen with the scenic views and also the abundant Chiltern gentians in mind just in case the dry conditions often experienced at this time limit the fungal interest. If you visit on your own, choose a clear bright calm day and you will not be disappointed, I assure you. Enjoy!

fig.37 *Boletus luridus* (Lurid Bolete) Watlington Hill 11 Sep 2008 (PC)

fig.38 (left) *Hygrophorus unicolor* and fig.39 (right) *Hygrophorus arbustivus* Watlington Hill 11 Nov 2004 (PC)

MORE MYTH AND MADNESS – The Cultural History of Ergot

Brian Murray

In 994 AD 40,000 people in southern France were stricken with a terrible plague. The symptoms were many and varied, ranging from gangrene to madness. This epidemic

was but one of many affecting entire regions in Dark Ages and Medieval Europe, an illness that could have had a profound effect on the development of early modern Europe. However, the cause of this illness remained mysterious until well into the 16th century when it was discovered that this was not an infection of man, but of mushroom.

The culprit was *Claviceps purpurea* (Ergot) (figs.40 & 41), an ascomycete, the spores of which infect cereal crops, particularly 'coarser' grain such as rye. It produces sclerotia (hard, violet–black nodules) which each replace a grain and are a resting stage in the fungus's life cycle (summarized below). Chemicals produced in the sclerotia have been a source of fear and fascination for mankind for centuries.

DIAGRAM: Simplified life–cycle of *Claviceps purpurea*

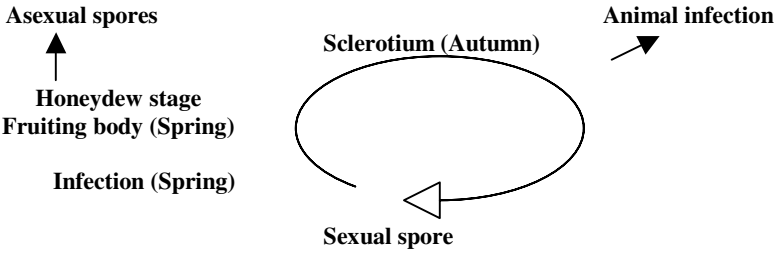


fig.40 *Claviceps purpurea* sexual fruitbody (ARO)

fig.41 *Claviceps purpurea* sclerotia (ARO)

Pharmacology **Ergot contains a number of pharmacologically active compounds, the main group of interest being the ergot alkaloids, the effects of which are many and various: they can induce abortion, speed labour and reduce bleeding after birth; cause narrowing of the blood vessels and affect the action of the heart; inhibit milk production in mammals; cause delirium and mental impairment. Many modern medicines, from obstetric treatments to LSD, have their origins in ergot.**

Although symptoms of ergot poisoning can occur with contamination as low as 1%, the effects of poisoning are not well understood. In particular, complex interplay between ergot's chemicals and their sites of action in the body make chronic

poisoning more complex and unpredictable than acute. Historical records describe two types of ergot poisoning: 'convulsive' ergotism - characterized by muscle jerking and mental symptoms - and 'gangrenous' ergotism - characterized by loss of limbs from poor blood supply. It is tempting but difficult to assign these two types to either acute or chronic overdose. The table below is my attempt to collate the symptoms and let the reader decide. The acute / chronic symptoms are taken from a modern pharmacology textbook, the rest are mostly from Barger, whose 1931 book on ergotism is one of the most widely quoted on this subject.

Table: attempt to classify symptoms of ergotism

Acute - (possibly exacerbated by pre-existing fever, liver damage, blood vessel disease)	**Diarrhoea /vomiting; thirst; paeresthesia ; cold sensation in limbs; tachcyardia; delirium; loss of consciousness.**
Chronic	**Angina &/or chest pain; autonomic instability; vasoconstriction leading to dry gangrene.**
Convulsive	**Lassitude; anxiety symptoms, spasms; epilepsy and psychosis; chest pain; livid skin colour; swelling of hands and feet; loss of peripheral sensation; hunger; insomnia.**
Symptoms common to both	**Diarrhoea /vomiting; hot / cold sensation; (calf) muscle pain; jaundice*; skin vesicles; mental impairment (sometimes permanent).**
Gangrenous	**Lassitude; myalgia; swollen limbs; burning pain; alternating hot and cold; numbness associated with livid, vesicular skin; 'dry' gangrene eventually leading to the limb shrivelling and falling off.**

***personal interpretation of Barger's description.**

Early history and entheogenic hypotheses

No article on ethnomycology would be complete without a tall story or two, and ergot is no exception. Barger estimated that rye was cultivated in central and northern Europe for about 400 years before the arrival of Christianity; it is reasonable to assume that the history of ergot starts in earnest then. However, many authorities go back much further and confidently ascribe knowledge of ergot and its physiological effects to the ancient Chinese, Parsis, Assyrians, Arabs and Greeks, though I can trace no reliable original sources for this. Furthermore, the claims lack plausibility: these cultures only knew of rye as a weed (if at all) and few had the climatic conditions that encourage ergot. The only culture that *did* grow rye in significant quantities is that of modern Europe, which was hit by wave after wave of ergot epidemics for over 500 years before the penny dropped. Is it (a) likely that the secrets of ergotism were more obvious to peoples with far less exposure to ergot than the Europeans, or (b) plausible that *all* these cultures lost their knowledge of ergot?

In last year's newsletter I mentioned Gordon Wasson, retired banker and self-styled ethnomycologist who proposed that many ancient religions had used hallucinogenic mushrooms. Wasson teamed up with chemist Albert Hofman and classicist Carl Ruck

to argue that ergot was used in the ancient Greek festival of the Eleusinian Mysteries. There is, however, no physical evidence for these claims: Wasson was hindered (or, depending on your perspective, helped) by the 'secret' nature of these rites, although arguably what happened in Eleusis is no more mysterious to a modern audience than many other archaeological events: participants consumed a ceremonial drink called the 'Kykeon' and then, according to Wasson, hallucinated the 'secret' of Eleusis, thought to have been the granting of life after death. However, even Ruck agrees with most classicists that this revelation was conveyed by some kind of theatrical presentation: it would be impossible to get a large crowd to hallucinate on one topic. Also, the severe side effects of natural ergot would vastly outweigh its rather weak hallucinogenic action, the Greeks having none of the advanced chemical wizardry needed to synthesize more potent, safer, hallucinogens from ergot. For that, civilization would need to wait another three and a half thousand years.

There is, however, physical evidence of ergot in the stomachs of many Iron Age 'bog bodies' (e.g. Tollund man) discovered in modern Europe where corpses had apparently been ritually sacrificed. John Grigsby has proposed a Wasson-style hypothesis that ergot-infected rye was administered as an essential part of their ancient ritual. However, the only source I have found which specifies the amount of ergot found in the bog bodies gives a value of 0.5g of ergot per kilogram, this being well within the range of natural contamination and nowhere near enough to cause any interesting physiological or mental reactions.

The true history of ergot **It is embarrassing that much ethnomycology concentrates on outré entheogenic hypotheses, overlooking some fascinating but undisputed accounts. It is quite possible ergot changed the course of Western history. Barger lists several epidemics of ergotism between 857 AD and the end of 18th century, these occurring in 2 'spurts': from the turn of the 11th to the mid 13th century affecting wide areas especially in France and Germany, and from the late 16th to the late 17th century with more sporadic localised outbreaks.**

Geography was a factor, with France tending to experience the gangrenous form of epidemic, and areas now in Germany experiencing the convulsive type. There is no obvious reason for this, although many theories, such as differences in diet, have been suggested. Furthermore, it is possible that the distinction between the two types of epidemic may not be as clear-cut as some authors believe. Great Britain escaped with only isolated cases, probably because our stable climate and generally fertile soil means rye has never formed a large part of our diet. In France, however, it is thought that 40,000 or more people died in one epidemic in 994 AD (assuming all victims did indeed die of ergotism). The striking nature and pain of the disease suggested to medieval minds that it was punishment from God, and earned it the nickname 'holy fire'. So seriously was it taken that it was given a day of prayer and also its own monastic order, the monks of St Anthony's, set up in 1093 exclusively to tackle the disease (giving rise to its other sobriquet, 'St Anthony's disease'). Patients nursed within the monasteries were probably given a better diet with less emphasis on rye and many did therefore seem to improve. If a limb did fall off it would often be associated with some relief of symptoms and seen as a cure – mummified limbs would often be left at altars and shrines as an offering.

The value of cleaning grain against a variety of diseases has been known since

antiquity, but it has been argued that in times of adverse weather failed harvests forced the poor to eat grain which would otherwise have been rejected. Although this is the most common explanation for ergot epidemics, background reading gives mixed support: many epidemics occurred in the relatively benign climate of the Medieval Warm Period (MWP) from about 1000 – 1250, whilst many recorded famines have no associated outbreak of ergotism. The other explanation for the timing of epidemics argues that they are explained by weather conducive to ergot and quite possibly different from that conducive to famine. It is thought ergot favours wet, mild springs and dry (possibly windy) ripening seasons, conditions which might escape attention and not have been recorded. Behringer, a climate historian, commented that springs in the MWP were highly variable.

Understanding ergot **The first recording of the physiological effects of ergot was made in 1582 by Lonicer, a German doctor who noted it can induce and speed labour. Other reports followed, many claiming that the effects of ergot had been known amongst 'wise women' (early midwives) for some generations before. However, ergot was considered a kind of 'super–rye' on account of the infected ear being up to ten times bigger than normal, and the connection with ergotism was not made until 1676 when Dodort, a French scientist, investigated an epidemic in Sologne. In 1711 Geoffroy noted ergot was a separate organism from rye, but in Germany these discoveries were slow to catch on, at some cost to their population; however, by 1722 Bavarian authorities were able to avert an epidemic by exchanging grain. After the 1770 outbreaks, the danger of ergot was well recognised and governments, assisted by advances in cleaning technology, enacted reforms to limit the amount of ergot permissible in rye grain.**

Towards the end of the 19th century our relationship with ergot changed dramatically: ergot-derived medications were extracted from rye crops deliberately grown to *encourage* its infection! Mankind had moved from ignorance to fear to cultivation of ergot in just a few years.

The impact of ergot **Serious historians sneer at attempts to answer the 'what ifs' of history. Fortunately I am not one. Some have argued that ergot epidemics seriously weakened early European culture resulting in, amongst other things, the division of the Holy Roman Empire into what we now know as France and Germany. France, weakened by these epidemics, was unable to fight off Norse invaders who settled in Normandy - 1066 was to follow. (If the Norse invaders really were strengthened in battle by *Amanita muscaria* as some have claimed, then the early history of Europe could be seen as a battle of the fungi!)**

Some have claimed ergot and other psycho-active herbs were used in semi-organised witchcraft cults although there is no evidence 'witches' really existed, Wicca and related cults being modern inventions. Possibly accusations of witchcraft may have been associated with *accidental* ergot poisoning (the Salem witchcraft scare being a commonly touted example). We know that when harvests were bad witch trials were more common. Could ergot have been part of the connection? There is considerable overlap between the symptoms of ergot poisoning and those of alleged witchcraft. It is said 'wise women' were frequently accused of witchcraft - could dabbling with ergot have led to this?

If ergot epidemics reflected wider climatic and agricultural problems, then it becomes

hard to unravel cause and effect. It certainly seems reasonable to see ergot as an important factor in European development. If humanity had realised sooner the nature of ergot, much suffering might have been avoided. As it is, ergot stands as a testimony to the 'fault line' between medieval supernatural explanations for misfortune versus the scientific approach that unravelled its secrets.

The 20th century and ergot **Ergotism has raised its ugly head only in isolated cases in the 20th century. Mid-century ergot made the headlines not in its natural state but as an altogether more potent derivative: LSD. This was developed almost by accident by the chemist Albert Hofman in 1943, who was experimenting with ways of improving the obstetric action of ergot derivatives. He spilt some on his skin and noticed its intense psychic effects immediately. Then in 1951 there was an alleged outbreak of ergot poisoning in the French town of Pont-Saint-Esprit; Hofman investigated. Approximately 250 people were affected, with 7 deaths, all attributed to 'cursed bread'. Although commonly referred to as one of the last great outbreaks of ergot poisoning, he concluded that mercury compounds, used ironically as an antifungal on grain seed and which had erroneously got into the food supply, were to blame. An alternative hypothesis published recently suggests this was in fact part of a CIA- inspired plot to test LSD as a weapon on the local population!**

Conclusion ***Claviceps purpurea*** **remains one of the most enigmatic of fungi. In its sclerotium form it is not easily identified as a fungus at all, and for years it masqueraded as part of cereal crops, poisoning thousands along the way. The early history of ergot is characterized by illness, terror and political instability. Subsequently it has evolved into medicines used for Parkinson's disease, migraine, blood pressure and childbirth. Perhaps we have tamed ergot, but epidemics in the developing world remain a distinct possibility.**

A START ON BRACKETS, FOR BEGINNERS

Penny Cullington

When I first started foraying about 17 years ago I knew precisely nothing about fungi, and my main interest at that time was in learning what fungi I could safely pick to eat. Does this ring a bell with you? In fact many people start out this way, little realising what a vast subject they have just embarked upon, and to some this soon becomes a daunting prospect and acts as an instant turn-off, what with all the Latin names and talk of microscopes and other fancy and mysterious terms. But to others (and if you are reading this you are hopefully amongst this group, as I was) a new journey of discovery begins, and although you may be daunted you are also intrigued and determined to learn more.

For several years I focused on mushrooms and toadstools and quite deliberately overlooked even the commonest brackets (gill-less fungi growing on trees) because there seemed to be so much to take in and so many names to learn, and it made sense not to bite off more than I could chew. However, I was soon aware that those "experts" making lists on forays were always looking at wood and scribbling down names such as *Stereum*, *Trametes*, *Ganoderma*, *Piptoporus*, *Daedaleopsis* ad infinitum, and I marvelled at their amazing wealth of knowledge and at the ease with which all the terminology seemed to trip off their tongues. (I now realise that it's this repetition

of 'fungal language' on forays which eventually begins to sink in and names start to become familiar and less daunting. I hope you are beginning to find this too?)

I eventually thought the time was ripe to overcome my blank on brackets when the unfortunate foray leader (who'll probably be chuckling when he reads this) kept repeating the same two names for my specimens with only a perfunctory glance each time. It was becoming embarrassing: what was I missing and why couldn't I learn to do this as well? I speak of *Stereum hirsutum* (Hairy Curtain Crust) and *Trametes versicolor* (Turkeytail), two of the commonest deciduous woodland fungi which you can virtually add to any foray list as you get out of the car because they are almost bound to be there at any time of year - in other words the blue tits or house sparrows of any bird list, stocking-fillers, even bums on seats!

Both species are found growing in clusters, tiers or even lines on fallen branches of many deciduous trees but especially Beech, Oak and Birch, and are roughly semicircular in shape, starting flat but eventually sitting at right angles to the wood. Both are quite variable in colour but always with concentric zoning on the upper surface, and can get to about 5 to 6cm across. Considering their Latin names:

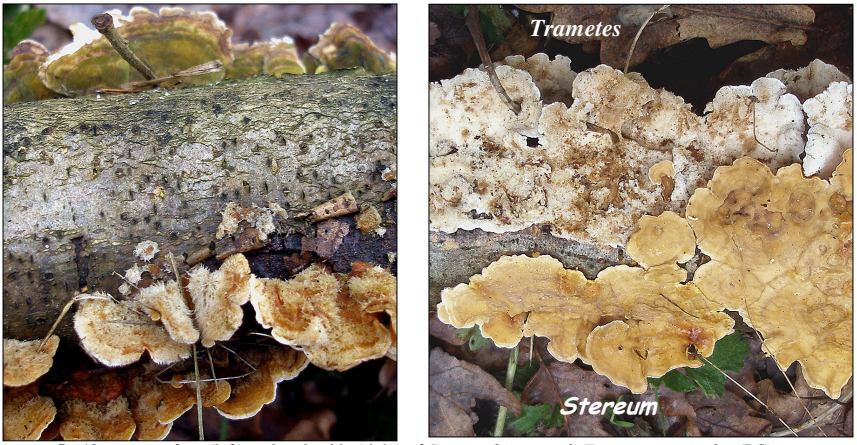


fig.42 upper surface (left) and underside (right) of *Stereum hirsutum* & *Trametes versicolor* (PC)

fig.43 *Stereum hirsutum* underside (left) (DJS) and *Trametes versicolor* underside (right) (PC)

although *hirsutum* means hairy and indeed its fine hairs are a characteristic of this *Stereum* species, they are not that obvious to a beginner even with a x10 lens. Furthermore, although *versicolor* means varied in colour, this character can be true of both our species so is not necessarily terribly helpful either. Take a look at fig.42 (left) where both species are to be seen growing side by side on the same branch. Often their upper surfaces are distinctly different, but as can be seen they can also clearly be very similar, thus making confusion quite possible; but turn them over (fig.42 right) and all is revealed in an instant because one is orange underneath and the other is white – easy! The underside of *Stereum hirsutum* is also smooth (fig.43 left), whereas that of *Trametes versicolor* has pores – a mass of tiny holes visible with the naked eye but even clearer with a x10 lens (fig.43 right).

Once you become familiar with them you'll soon realise that there are other visible differences between them. The upper surface as well as the underside of the *Stereum* often shows a tendency to orange, it can also lack much zoning and the whole fruitbody is flimsier in texture, being quite easy to pull away from its wood substrate. The upper surface of the *Trametes*, however, always contrasts clearly with the underside, is never as orange, is always strongly zoned, and can be found with really quite pale zoning but also darkish brown or even black (fig.44); furthermore, the texture is much tougher, it being often a struggle to wrench it away from its substrate.

fig.44 *Trametes versicolor* with dark upper surface (PC)

fig.45 *Bjerkandera adusta* (PC)

Just as you're thinking "Great! That all sounds quite straightforward" I'm about to throw a small spanner in the works – well, we are talking about fungi here – you guessed it: there's a third species lurking in the wings! Take a look at fig. 45 which looks spot on for the zoning of the *Trametes* but is in fact a completely different genus. It is almost as common and grows on the same range of woods throughout the year, is similar in size and the zoning on the upper surface can make it almost indistinguishable. Was that a groan I heard? Fear not! Take another look and notice the deliberately upturned specimen in this photo, because here yet again lies the key. Instead of being white with pores underneath like the *Trametes*, it is distinctly grey and smooth (but with fine pores under a hand lens) and a contrasting white rim. This

tells us straight away that it is *Bjerkandera adusta* (Smoky Bracket) often affectionately known as BJ for obvious reasons. (The B is silent when pronouncing the genus name, by the way.)

The first bracket I felt confident to identify was *Piptoporus betulinus* (Birch Bracket), and from there I progressed to the three species above. It gave me a start, a tentative foothold in the world of brackets. They're all so common that it's easy to practice separating them in the field whenever you're out walking, and once they're really familiar you'll soon be taking further steps and increasing the number you're familiar with. It's all a question of being assured of a few to get you going, and then continuing on from there.

I finish with a word of advice to help you through the tortuous tangle that is learning about fungi: never pass by an opportunity to pick the brains of those with more experience and knowledge, even if it means appearing moronic, inattentive or whatever. In fact, I know from experience that one always remembers a lesson learnt the hard way, when one was made to feel an absolute fool! On one occasion (not that many years ago) I proudly posted 10 different (I thought) corticioids (fungi known affectionately as white paint on wood to those of us uninitiated in the specialism needed for this group) to expert Nick Legon; imagine my mortification and embarrassment when he informed me with much amusement that they were all the same very common species: *Schizopora paradoxa* (Split Porecrust)!

fig.46 View of Watlington Hill with red kite – see the article on page 26 (PC)

Penny Cullington, 24 Willow Lane, Amersham, Bucks. HP7 9DW Tel: 01494 721979
e-mail: p.cullington@ntlworld.com

Derek Schafer, Duck End House, Hawleys Lane, Whitchurch, Bucks. HP22 4LB Tel: 01296 640923
e-mail: fungi@bucksfungusgroup.org.uk

Toni Standing, 22 Place Farm Way, Princes Risborough, Bucks. HP27 9JH Tel: 01844 343452
e-mail: thestandings@waitrose.com