Fungus Survey of Oxfordshire

Newsletter 2014

***Tricholoma hemisulphureum*–Caroline Jackson-Houlston**

Notes from our President

A long season in 2013 It is a cliché that no two fungus seasons are identical, and 2013 was yet another demonstration of this familiar fact. It was still able to spring some surprises. I spent much of the early spring focussing on ascomycetes for a change, partly stimulated by collecting specimens for Peter Thompson's book *Ascomycetes in Colour*, which he published at the end of the year. Many of these are thoroughly inconspicuous pyrenomycetes, hiding within twigs, and their discovery is a matter of luck and persistence. Since they are often specific to one particular plant, it is also necessary to recognise the identity of all manner of dead twigs. However, the brilliant orange *Pezicula* (formerly *Ocellaria*) *ocellata* clustered on willow twigs is recognisable even from a distance; it was found in a willow carr in Shiplake, right at the edge of the county. This species was a first for me, and duly illustrated as a 'supplement' to Peter Thompson's book.

In my own little wood, near Henley, virtually every fallen blackberry leaf in March was covered on the underside by minute hairy cups of *Fuscolachnum dumorum* – a discomycete that took me some time to identify.

Editor's News

www.fungusoxfordshire.org.uk

Once again our new website has proved rewarding. We are delighted to have a number of new members join us who found out about us through our web site. Again, many thanks to Peter Davis (BFG) for all his help with the website. Congratulations to our President on his new finds and being made vice President of the British Mycological Society. We look forward to the seeing him in a BBC4 film on fungi in Scotland (see his report). Congratulations also to our Chairman, Alison Banham, who has been made a Professor and Head of her Department at the Nuffield Department of Clinical Sciences.

Molly Dewey

Pezicula (formerly *Ocellaria*) *ocellata* Photo: Peter Thompson

The long, dry summer meant that in the south of the county at least there was virtually no fungal activity until September. In my experience after such a summer the first real rains signal the arrival of plentiful boletes, including everyone's favourite comestible, the cep. However, the surprise was that this did *not* happen. It turned out to be a rather poor *Boletus* year around us. On the other hand it was a remarkably good year for other mycorrhizal fungi such as *Lactarius* and *Russula*, though less so for *Cortinarius*. Some 'rarities' proved common this year: for example *Lepiota ignivolvata* positively teemed in part of our Chiltern beechwoods. It also grew rather large, making understandable the confusion of this poisonous species with *Macrolepiota konradii* by inexperienced forayers.

It also proved to be an unusually long season as the frosts held off. National Fungus Day on October 13 was marked by a foray near Henley with spectacularly large giant puffballs, which made it into the *Henley Standard*. In Flowercroft Wood the lovely orange *Amanita crocea* was discovered. On the other hand, the grasslands, as at Crowsley Park, were not at their best, with very few *Hygrocybe* species, and the normally abundant mosaic puffball (*Handkea utriformis*) being represented by just one fruitbody. It is hard to say what made this a poor year for this normally reliably diverse locality.

The upside of this 2013 was the continuation of 'the season' until Christmas. On the edible front, this was the best year ever for *Cantharellus tubaeformis*, the trumpet, or as I prefer to call it, the winter chanterelle. It teemed in its thousands, and carried on and on. We picked a basket full on Boxing Day. On the other hand its relative *Craterellus cornucopioides*, the horn of plenty, hardly bothered to make an appearance this year. Some seasons it can abound. There were plenty of *Hydnum repandum* around, and this species continues to grow under the leaf litter, so late examples can be quite massive. I am surely not alone in wondering what controls the temperamental fruiting appearance of particular fungi. There must be a pattern, but many years of trying to discern it has left me none the wiser.

On the rarity front, a little white discoid, but red-staining ascomycete clustered on *Rubus* twigs in my wood was identified by Peter Thompson as '*Calycina*' *haematoidea*, a species previously known from one collection – from New Zealand! If this is confirmed it is a remarkable occurrence. One of my visitors to the wood had been to New Zealand the previous year, which prompts speculation about movement of spores. The case is still under investigation.

At the opposite end of the spectrum, I have been studying the common species of *Crepidotus* on twigs for several years. Most books still record *C. variabilis* as the commonest species. It is indeed quite common, and does form large assemblages of fruitbodies on sticks. However, *C. cesatii*, with very different spores, is certainly commoner on a wide variety of hosts, including bramble twigs particularly. By any normal reckoning it is the most abundant species. *C. luteolus* and *C. epibryus* also turn up regularly, the latter especially later in winter. Although *C. luteolus* tends to look a little yellow, and *C. epibryus* often looks 'all white' field determination is unreliable. *C. authochthonus* and *C. versutus* are the 'rarities'. The message is that for this genus, the microscope must be used.

Members might like to know that I have been elected as Vice President of the British Mycological Society, starting in 2014. I have also made an hour long mushroom programme for BBC4 (or even BBC2), a process not without its frustrations. It should be broadcast in April. I always hoped that in my later sixties more time would be available to join forays, but life always seems to get in the way.

Richard Fortey FRS

FSO Foray to the Warburg Reserve, 26 October 2014. In the centre, our recorder, Judy, discussing with our President, Richard, the identification of an interesting find. Photo: Molly Dewey

A word from our Chairman

While 2013 was a good year for fungi, sadly John and I did not make it out much with you last year. Coordinating the social activities of a trio of teenage girls and acting as their chauffeurs around Oxfordshire is proving fairly time consuming!

However, it was great to see so many new faces on the Bagley Wood foray prior to the AGM, the youngsters being fascinated by fungi and our recorder, Judy Webb, effortlessly transitioning back into her previous role as a teacher. This expansion of the group really shows that all the work which went into the website (with particular thanks again to Molly Dewey, Marketa Samalova and Peter Davis) has been very worthwhile in

helping like-minded people to get in touch with us.

As I haven't been out much on the forays this year I thought I would share some interesting fungal related information that I came across in the scientific literature in 2013.

Firstly, I was fascinated to discover that scientists at the National Institute of Health (NIH) decided to characterise the fungi present on healthy human volunteers. Although a nice walk in the woods does sound more attractive, this dedicated team used Q-tips and toenail clippings to collect fungi from multiple sites on the body. More than 80 genera were identified using DNA sequencing analysis, with feet and toenails having the most diverse arrays. This information will be used to help in the study/treatment of fungi that have either beneficial or harmful roles in humans. Original paper at doi:10.1038/nature12171

Interestingly fungi can behave differently during spaceflight! *Candida albicans* is ubiquitous in human-made environments and can cause diseases, such as thrush or more seriously systemic candidiasis, particularly in immunocompromised individuals. Apparently this is a particular concern during space flights as they weaken astronauts' immune systems and make them susceptible to such infections. The research group in Arizona discovered that the expression of 452 genes differs when this fungus is cultured on earth, versus in otherwise identical spaceflight conditions. I was interested to learn that under microgravity conditions fluid-shear is reduced and that this can mimic conditions in some regions of the human body such as gastrointestinal and respiratory tracts. Thus this study may help understand how this fungus infects humans and causes disease. Original paper at doi: 10.1371/journal.pone.0080677

Returning to a more familiar type of fungus, the morel *Morchella crassipes*, it turns out the while we enjoying eating them, this morel may itself eat bacteria. A group in Switzerland looked at the relationship between this fungus and *Pseudomonas* bacteria by feeding either the bacteria or fungus with carbon-13 (a non-radiactive form of carbon that can be distinguished by its increased mass using a mass spectrometer). The researchers then tracked the flow of nutrients between the fungus and bacteria. It appears that initially the bacteria gained nutrients from the fungus (feeding phase) but that later carbon from the bacteria was incorporated into fungal sclerotia (harvesting phase) that the mycelium uses as a food store during unfavourable conditions. There is now an ongoing debate as to whether these data suggest that this fungus is actively farming bacteria by initially feeding them and then devouring them. Original paper at doi: 10.1098/rspb.2013.2242

I look forward to seeing more of you all in 2014.

Alison Banham

2013 Foray round up news from our Recorder

2013 was an interesting year for fungi as highlighted by our President. 12 forays were planned and 11 actually happened. You will have received all the lists by now so I shall pick out only a couple of things. Warburg Reserve as usual produced the most species with its range of really good habitats and large area of beech woods producing interesting *Cortinarius* species as well as numbers of deathcaps, *Amanita phalloides*. Hackpen Down produced the least species number. It is quality chalk grassland and should have had lots of grassland fungi such as waxcaps, but it obviously had not been wet enough for long enough before the foray to promote fruiting. Woodlands are usually much more reliable for a good species list than grassland at any time of year. This is illustrated by the foray to Beacon Hill at Aston Rowant NNR. The very short chalk grassland with numerous anthills colonised by rockrose produced spectacular mycorrhizal species associated with rockrose like *Lactarius evosmus, Tricholoma hemisulphureum* and *Cortinarius anomalus*. Sharp-eyed Keith Cohen found one specimen of big blue pink-gill, *Entoloma bloxamii* , first record for the NNR as we have previously only found this rare UK BAP Priority Species at Watlington Hill not far away on the Chilterns.

Entaloma bloxemia

Photo Judy Webb

Alongside commoner waxcaps, toasted waxcaps *Hygrocybe colemanniana* were numerous in small rings but the really big rings were all clouded funnel, *Clitocybe nebularis*. A good list was achieved and on return to the car park a small group of us decided to continue foraying on in the Beechwood on clay with flints known as Grants Plantation, still within the NNR. Here we in fact produced more species than the whole group had found on the top of Beacon Hill in the short grassland. I particularly remember clumps of dark purple *Mycena diosma,* with its strong tobacco smell, the first time I have experienced this.

On a personal note, I was delighted to have Martyn Ainsworth of Kew Mycology department confirm my identification of a rare smut fungus (*Urocystis filipendulae*, Dropwort Smut) collected in 2012 on dropwort, *Filipendula vulgaris* from a floodplain hay meadow near the A40, namely Yarnton West Mead, an SSSI. The fungus causes a characteristic gall – a swelling and distortion of the midrib of the leaf. Later (May-June) this swelling bursts open, liberating the blackish spores which have a characteristic sculpturing. I got an email from Martyn confirming the identification with just the title 'Smut, smut, smut….' (a little surprised that got through the internet filter system!). He then went on to say:

'*It seems that if anyone had given it a conservation assessment, it would have been* ***Extinct in Britain*** *as the last collection was made in 1897 (on calc. downland, Amesbury, Durnford Down, S. Wilts on 9 May 1897).*'

Urocystis filipendulae, Dropwort Smut
Photo : Judy Webb

So now my specimen of this no-longer-extinct fungus is safely in the Kew collection.

I'm looking out for further examples of this fungus this year so do look at any Dropwort leaves you come across in May and June and let me know if they show this characteristic gall. Please take and dry one leaf specimen if you find it. I'm also after a rust fungus on Dropwort leaves as well – red powdery fungal patches on the leaves (caused by fungus *Triphragmidium filipendulae*). Other interesting leaf fungi that are Biodiversity Action Plan Priority species I shall be looking out for this year are: Colchichum rust (*Urocystis colchici*) on the leaves of the autumn crocus *Colchicum autumnale* (also called 'naked ladies') in May and Felwort rust (*Uromyces gentianae*) on the leaves of autumn or Chiltern gentians at Aston Rowant. Do let me know if you find anything likely to be these.

I attended the autumn BMS conference at Kew Gardens on Saturday 30th November 2013. The theme was 'the Geography of Fungi'. There were interesting talks on new fungal diseases, lichens and the fungi which live within leaves (endophytes). To me the most interesting talks were on mycorrhizal fungi, where DNA analysis of soil is of course revealing a huge, previously unknown, diversity. We think of mycorrhizal fungi as the Boletes, Russulas, Cortinarius, chanterelles and Inocybes we find under woodland trees. Of course these are the ectomycorrizals which produce visible fruiting bodies and associated with roots of trees like beech, oak, birch, hornbeam, lime, pine, larch. Some trees (sycamore, hawthorn, ash, cherry whitebeam, rowan have endomycorrhizal fungi which do not have any above-ground fruiting bodies). As regards ectomycorrhizal fungi, one little nugget is that ***half*** of all species belong to the genera that are resupinates (i.e. mats or encrusting layers) like Tomentellas or are true truffles or have no visible fruiting bodies at all. The soil in a woodland is far more complex than one can imagine.

The most shocking talk to me was by Laura Martinez and Sietske Van der Linde of Kew on the effect of air pollution (diffuse Nitrogen deposition) on mycorrhizal fungi fruiting and species diversity across Europe. They looked at ectomycorrhizal diversity and fruiting in woods in 9 different countries in Europe. These woods were exposed to a range of concentrations of NOX Nitrogen pollution from the air of between 5kg and 30kg N/Ha/year. NOX is shorthand for Nitrogen Oxides produced from any kind of fuel burning in air. A lot comes from car exhaust. It is clear that increasing N deposition suppresses

fungal fruiting and thus collectors out picking fungi for consumption across Europe report much reduced hauls. The effect on fungal species diversity is serious. In the low nitrogen deposition areas, they found that the more soil cores they analysed, the more mycorrhizal species were found by DNA analysis, i.e. high species diversity. In the high N deposition areas, there was a low soil fungal mycorrhizal species diversity and they did not find any more species, however many soil cores they analysed. The more sensitive species had actually been eliminated.

The consequences for the host trees are unknown. These two authors have worked out a 'Nitrogen Critical Load for Ectomycorrhizal Fungal Species Richness' which is 9.5-13kg N/ha/year. Above 17kg N/ha/year the ectomycorrhizal fungal community is seriously affected. Examples of some of the most sensitive species are *Lactarius chrysorrheus*, *Boletus reticulatus, Boletus subtomentosus* and some *Cortinarius* sp. *Boletus pruinatus* was tolerant of intermediate amounts and relatively tolerant species (18-35kg N/ha/yr) are, for example, *Scleroderma citrinum* and *Russula parazurea*. There is a Nitrogen deposition limit above which *Tricholoma* and *Cortinarius* species just never appear. Can trees do well with less diversity of mycorrhizal fungi? Can they survive without mycorrhizal fungi? We do know that mycorrhizal fungi (apart from their role in promoting nutrient absorption for the tree) protect tree roots from pathogens, so perhaps the abundance of honey fungus, (*Armillaria*) attacking trees I have seen in some local woodlands last year maybe related to reduction or loss of mycorrhizal species, allowing honey fungus or other tree diseases in via the roots. That is just a guess, but it seems logical. Hope someone, somewhere might be studying this.

To end on a more positive note, the best bit of the conference day for me was listening to a talk by one of my ex- A level biology students from my last year as teacher at Milham Ford School, Oxford, in 2003. Here she was as Dr Filipa Cox, with a PhD in fungal research from Kew and now working as research assistant at Manchester University, just returned from studying Antarctic soil fungi! (which was what her talk was about, of course all DNA analysis of soil cores). I was very proud……

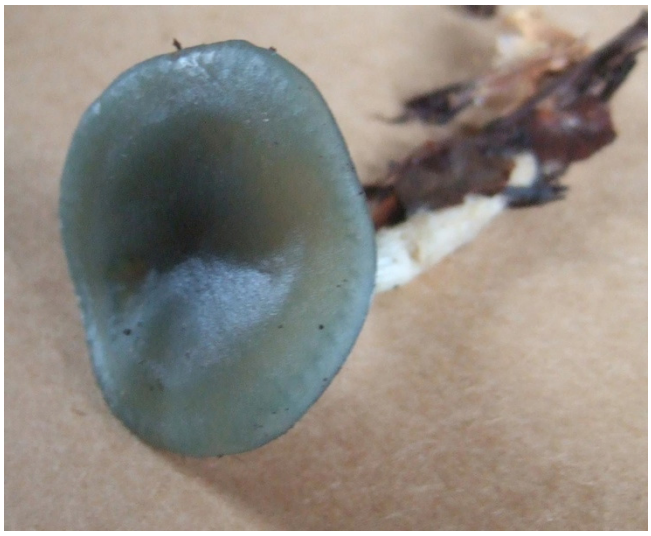
I am grateful to the FSO for funding my trip to the Autumn Conference of the BMS and for purchase of mycology texts to assist in identifications – Geoff Kibby's 'The Genus Russula' and 'British Boletes'. Remember these are available with me should any other group member wish to consult them to help in their own fungal identifications.

Finally a big thank-you again to Wendy MacEachrane for working hard on the 2012 foray data entry to MycoRec on the group's laptop. Perhaps another volunteer could help out with the 2013 forays and give Wendy a rest this year?

Judy Webb

Notes from John Killick taken from his articles for the Oxford times

ANISEED FUNNEL *Clitocybe odora*



Clitocybe odora Photo John Killick

Some toadstools are identifiable almost at once by their smell; this fungus smells strongly of aniseed. Small numbers turn up on quite a few fungus forays in the leaf litter of broad-leaved trees notably beech. It is edible but you need to be sure of its identity and while its bluish colour helps, an unrelated poisonous *Stropharia* has a similar colour. If you leave the cap gills downwards over paper overnight you can hope for a spore print, white in this one (but also in other poisonous *Clitocybe*) and black in *Stropharia*. With its strong flavour it is best dried and used as a spice or condiment, rather than eaten whole. Like most toadstools described before 1800 it was placed with mushrooms in the genus *Agaricus* and it was not until 1871 that a German, Paul Kummer, put it into *Clitocybe*. The scent is due to an organic chemical with a CHO group called an aldehyde; some of these have distinctive odours.

IVORY FUNNEL *Clitocybe dealbata*

Clitocybe dealbata Photo John Killick

Despite the popular image of toadstools being toxic, only relatively few are, but this is a fairly common and seriously poisonous fungus of pastures and parks. The toxin is muscarine; soon after being eaten it causes sweating, salivation and tears and then abdominal pains and diarrhoea. For people with heart and breathing problems it is a serious threat and has caused a few deaths. With white gills and spores, and no ring, it is obviously not a field mushroom, but fungus gourmets who like to eat white species like Fairy-ring Champignon must be more careful. Like it, it produces the fairy rings that Shakespeare's Prospero called "The green sour ringlets … whereof the ewe not bites". Fairy rings attracted much folk-lore but were not well explained until in 1792 the botanist William Withering implicated a fungus. Growing from a single spore, it uses up nutrients and must spread ever outwards. Where two rings meet, there is no food for either and that part of both rings disappears.

JELLY-BABIES *Leotia lubrica*

Leotia lubrica

I first met this curious little fungus late last year in a most unpromising gloomy habitat under scrub; in 2012's weather it was waterlogged; *lubrica* means slippery. It gets nourishment from rotted dead leaves and is also found with bracken, which grew nearby, and beside paths. Great numbers can grow together; although it resembles a small dull yellow toadstool it is related instead to orange peel fungus, the edible morels and even yeast. The cap, a centimetre across, has no gills but inside it are many narrow microscopic bags about a sixth of a millimetre long, called *asci* from the classical Greek word for the bags used to store their wine in. Each bag has eight long spores. Being small, it is seldom cooked though the taste has been described as bland or good. The species was first described in 1772 by an Italian, Giovanni Scopoli, who corresponded with the Hampshire naturalist Gilbert White of Selborne.

John Killick

A new species of *Botrytis* – notes from the lab

A colleague of mine from Plant Sciences, Robert Grant-Downton, loves to grow and breed Dalylilies (*Hemerocallis* hybrids). Robert had a hunch that a newly emergent foliar disease of Daylilies known as 'spring sickness' was caused by a fungus. And, sure enough, I manage to repeatedly isolate a non-sporulatating fungus from infected tissues that looked, in culture suspiciously like a species of *Botrytis*. Based on immunological tests and DNA sequence analysis of isolates we have shown that it is a new species of *Botrytis*. To my embarrassment, my colleagues have named it *B. deweyae*. It is most closely related to *B. elliptica* (lily blight, fire blight)

which is a major pathogen of cultivated Lilies (*Lilium)*. We believe that the emergence of this disease has been triggered by inbreeding of cultivated hybrids, in which genetic diversity and resistance to fungal pathogens has been lost. See Grant-Downton et al PLOS One.

Molly Dewey

A short-lived giant polypore

Ganoderma resinaceum Photo: Molly Dewey

We found this large (approx 40cm), relatively rare species of Ganoderma growing at the base of a mature oak tree by the side of our driveway at Sherwood Lodge, on land that was once part of Bagley Wood. Some texts say that you can set light to the resinous upper surface. We tried but no success!! It is distinguished from the more common species, *Ganoderma lucidum*, by lack of a marked stem. Growth of the fruiting body is relatively rapid and short-lived. I think we first noticed signs of growth in May 2013, more than 40 cm in total, and by January 2014 it was softening and appeared to be disintegrating. We have not been able to find any information about the effect of this fungus on the tree. All we can say is that this winter, in the heavy winds, the tree has lost several small well-rotted branches which is not a good sign.

Molly Dewey

A Feast of Boletes

Marketa Samalova - and her family picked these in mixed coniferous woods near her birth town Pilsner (birthplace of the famous Pilsner beer) in Czech Republic in September. So for any of you searching for Ceps-central Europe is the place to go!.

Boletus edulis Photo Marketa Samalova