

# L F S G

Newsletter No. 29 Autumn 2016



## Chairman's Notes

By Richard Iliffe

Welcome to this issue of our Newsletter which is designed by Robert Joyce. Many thanks to all who have submitted articles or photographs, and particular thanks to Rob for his skills and many hours of hard work as Editor.

Our last Newsletter was in the spring of 2013 so we have three autumn seasons to review. Memories fade rather quickly however and, with few written notes prepared at the time, only a few of our forays are reported in detail, though Tom Hering has provided notes on a few rarities, and he has also given some thoughts on the preparation of his revised county check-list, issued in 2015.

Our foray venues are many and varied and we have included brief histories of those which have been created on the sites of old colliery workings. It may be that in future Newsletters we could provide notes on the histories of some of our best known country parks and nature reserves.

National Fungus Day is a venture promoted by the British Mycological Society aimed at bringing fungi to the notice of the general public. It falls this year on October 9<sup>th</sup> but, as so many regional fungus groups take part, the events now tend to spread over the preceding and the following weeks. Ours will again be held at Leicester University Botanic Garden in Oadby and we look forward to the support of our members.

We have offered a varied programme of events this autumn, with more forays planned than ever before. We have included two new venues, Western Park in Leicester, and Clipsham Park Wood, which is at the extreme east of vice-county 55, lying close beside the border between Rutland and Lincolnshire. We look forward to a good attendance at both, and at all our other more familiar venues. We thank those who lead our forays, and we wish all our members an enjoyable autumn season in 2016.

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PICTURE ABOVE: "Beefsteak" By Rob Joyce



## LEICESTERSHIRE FUNGI STUDY GROUP COMMITTEE 2016

<b>CHAIRMAN</b>	<b>TREASURER/ SECRETARY</b>	<b>RECORDER</b>	<b>DEPUTY RECORDER CONSERVATION</b>	<b>FORAY SECRETARY</b>	<b>EDITOR</b>
Richard Iliffe	Alison Joyce	Dr Tom Hering	Dr Geoffrey Hall	Dr Irene Peat	Rob Joyce LRPS (As Alison)

### OTHER COMMITTEE MEMBERS

Ann Clark	Dr Richard Rogers	Dr Peter Long	Michael Dobson	Rod Freer
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### Foray Do's and Don'ts

With the number of new members increasing please find a reminder of our Dos and Don'ts when out on group forays:

#### Do's:

- **Keep to the areas indicated by the leader.** Often we have special permission to visit or collect from a site and there are sometimes restrictions. The leader should advise members of the duration of the foray and likely walking conditions. The leader should be aware of other activities in the area and advise the group as needed.
- **Wear suitable footwear and be aware of surroundings including tree branches at head height.** Inform others in the group of any trip hazards, exposed tree roots, brambles, uneven or sloping ground, awkward stiles etc. Use only permitted access points and avoid climbing walls, fences, and locked gates.
- **Park safely.** When assembling at start and finish do so away from the road. Follow highway code when walking on roads.
- **Inform the leader of any guests, especially children as this is a requirement of our insurance.** Dogs are only allowed on forays with prior arrangement and should be kept on leads.
- **Be considerate of other members in the group.** Some members may wish to take photographs and where possible we should allow them access to specimens before picking. However, photographers should be careful to avoid holding up progress on the foray.
- **Have a go at identifying for yourself, that is how we learn and all part of the fun!** If you do want to check with the leader or one of the other knowledgeable members of the group remember to dig the mushroom out with a knife or similar to ensure you have it all and note what it is growing on and what is nearby, especially trees.

#### Don'ts

- **Wander off from the group or leave early without making sure the leader is aware.** The leader should count members at the start and end of the foray. Members should remain in sight of the group for safety. Members who wish to deviate from the agreed route must inform the leader.
- **Collect species for consumption on forays.** Many fungi are poisonous and species should only be consumed after expert identification. Collecting edible species is not permitted at protected foray sites and collecting hallucinogenic fungi is illegal.
- **Enter fields with stock.** If it cannot be avoided, enter with caution, keep to footpaths and do not take dogs.
- **Pick specimens ahead of the group.** If you are ahead of the group do not pick specimens which the group would otherwise have found. Try to leave in situ for other members to observe first.
- **Ignore hazards in the area, including some plants, insects, snakes and other animals.** Inform others in the group of any water hazards particularly where banks are steep-sided.
- **Forget to share what you find.** We want to encourage members to develop their own skills in identifying fungi, however in order to maintain the recording aspect of the group it is essential that the leaders know everything that is found so remember to let them know.



## Chairman's Ramblings

By Richard Iliffe

Our Newsletter is prepared as a report on our recent activities so these notes were intended to be a review of the three years since our last issue in the spring of 2013. However this became a difficult task as we have been rather lax in preparing notes and foray write-ups after our outings. As a result, my report has rambled over several diverse subjects, hence the title.

We have included few reports on specific forays; just two that I prepared in 2014, but we have contributions from Tom Hering, Geoffrey Hall and others, covering a variety of interesting subjects.

It is now thirty-five years since our Group was formed, and over that time we have developed a routine for our programme of meetings and forays. We have, however, changed the venue for our winter meetings several times, either due to closure of facilities or to change of ownership. Since 2006 we have been comfortably settled at the Unitarian Chapel in Leicester, which was established in 1708. In addition to offering religious services it became a centre for secular social and scientific meetings, taking on the rather grand title of Great Meeting Rooms. It now provides us with good modern lecture facilities with a choice of rooms, and we very much enjoy being there. Thanks are due to Tony Fletcher for acting as key-holder, providing refreshments and helping to set up our meetings. Two later articles give some flavour of what we try to achieve at our winter indoor meetings.

At our outdoor events we averaged 16 autumn forays over the three years 2013-2015, and we also held two spring forays, enjoyed more for flowering plants and birdsong than for extensive lists of fungi.

We conventionally open the autumn season with an evening walk in mid-August, usually at Beacon Hill Country Park where we meet in the upper of the two car parks and walk through woodland and grassland to complete a circuit. This first meeting of the year is always very sociable as members renew acquaintance after the winter break.

Beacon Hill is one of several favourite sites that we aim to visit at least once each year. Others are Charnwood Lodge, Bradgate Park, Cloud Wood, and New Lount reserve. We have later reports on two visits to Cloud Wood, both in 2014, and New Lount is mentioned when we discuss the industrial origins of some of our foray venues.

We visit other sites quite regularly, and each year we try to investigate new locations. These often prove to be so rewarding that we want to visit them again and they soon become popular venues. Recently these have included Aylestone Meadows, in the river Soar flood plain in south Leicester; Brocks Hill Country Park, Oadby, and Battram Wood in the north-west of the county, the last two having been established on former agricultural land and now providing pleasant grassy walks among various maturing woodland plantations.

With so many sites to choose from we squeeze more venues into our programme each year. In 2016 we plan to visit nineteen sites, the most we have ever attempted in a three-month autumn season and a total that will be difficult to exceed. However, with increasingly mild winters, there is a temptation to add impromptu late season forays, so who knows?

Occasionally we lose a good site and this happened when Cropston Waterworks became 'out of bounds' in 2015 when Severn Trent Water put the property up for sale. This parkland site had developed over the years since the dam and treatment works were completed in 1871. The area below the dam had mixed mature trees and shrub borders, with good grassland on the lower slopes of the dam and a high quality hay meadow that was productive for both fungi and wild flowers. The habitat was different from any of our other foray venues and in consequence it gave us many rare and unusual records.

When glancing through a list of our favourite foray venues it is something of a surprise to note how many are on reclaimed land, either former collieries or quarries. New Lount reserve, Coleorton Wood, Bagworth Heath Wood and Newfields reserve are all on former colliery sites.

New Lount is a nature reserve and public open space on the site of the former New Lount Colliery, a deep mine that closed in 1968. A period of open cast mining followed and that came to an end in 1986. The whole site was reclaimed and landscaped by Leicestershire County Council in 1997 with the aid of various government grants. The level area which has given us several rare and red-data listed fungi is where the entrance roads and railhead were located, and the higher ground is landscaped spoil heaps that are now grassland and naturally re-generated birch woodland. Much of the site has calcareous soil from limestone in deep mine waste that was spread over the area, though the natural surface geology of the area is acid.



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Another favourite venue is Coleorton Wood, which only came to our notice a few years ago. It is on the site of the former Coleorton Pit which closed in the 1930's. The area was reclaimed and landscaped at the start of planting for the National Forest in the 1980's and now has attractive plantations of both conifers and hardwoods. It is managed by the same team of volunteers who maintain the New Lount reserve, and it was on their recommendation that we first visited the site. Bagworth Heath Woods was also added to our foray list quite recently. This is on land where two former collieries operated, Desford Colliery, which closed in 1984, and Bagworth Colliery which closed in 1991, when the 75 hectare site was restored and landscaped by Leicestershire County Council. Part of the site was planted as mixed woodland but large areas were left as grassland or have become self-generated birch woodland. An area to the east of the site was restored as natural heathland which is a scarce resource in Leicestershire.

Then we have Newfield nature reserve, a 5 hectare site restored as heathland and acid grassland with some scrubby woodland. It is part of a much wider area restored in 1990 by the National Forest on the sites of three former mines; Newfield Colliery, Moira Colliery and Donisthorpe Colliery. We have visited Newfield reserve several times, though we have only looked at a small part of the site. We have yet to investigate Donisthorpe Woods and the area around Moira, including the headquarters of the National Forest where a visitor centre with gardens and new woodland has been created, but parking and entrance fees are required there placing it fairly low on our priority list.

Several other reserves that we visit are on restored limestone quarries. The largest is Ketton Quarry where limestone has been extracted for the adjacent cement works, with a large area reclaimed and landscaped, creating a valuable Wildlife Trust nature reserve.

Cloud Wood is located beside Breedon Quarry, where limestone is being extracted for the road-stone industry. Over the years spoil from the quarry has been spread over adjacent land and as a result the surface soil over much of this L&RWT reserve is calcareous, providing a good habitat for flowering plants and fungi.

Lastly we have Dimmingsdale Reserve, also managed by the Wildlife Trust. The site was extensively mined for both lead and limestone in the 18<sup>th</sup> and 19<sup>th</sup> centuries, leaving a deep quarry site which has since flooded to create several attractive pools. The limestone was burned on site to produce lime which was loaded into rail trucks and taken off site, leaving strongly calcareous soils over much of the lower parts of the reserve.

In yet another change of subject, a review of our activities would not be complete without a mention of National Fungus Day. This project was devised by the British Mycological Society in 2013 and aims to bring fungi to the attention of the wider public. All regional fungus groups were invited to take part and in the first year we decided to run an event at the Leicester University Botanic Gardens. A group foray was arranged in the grounds in the morning, with an indoor exhibition of fungi for the general public later in the day. We mounted a table display of fresh fungi brought in by our members, all neatly set out and labelled, together with photo display boards, reference books and publicity material. The first event was held in the Coach House then, for the succeeding two years, we moved to the foyer of Knoll House, one of the old mansion blocks on the site. Our members were very supportive, both in providing collections and by attending during the day to talk about fungi to the attendees of all ages who came to the events. The displays of fungi were supplemented by a collection of lichens provided by Ivan Pedley, and he enlivened the afternoon with his promotion of lichens and the very many lichen-derived household and commercial products. We thank Peter Sykes for providing beautiful photographs of fungi for our display boards at all the events. We also thank the Botanic Gardens management staff for their encouragement and support. The feed-back from visitors was very positive and we look forward to repeating the event in October this year.

Another highlight of our programme has been the annual social evening held each November, ably organised by Robert Joyce at the Odd House pub at Snareston. We meet for drinks and to play a competitive but light-hearted game of skittles before sitting down to an excellent supper. It is our best attended event of the year, giving members, families and friends the opportunity to socialise and to chat informally about subjects other than fungi.

Finally, thanks are due to the committee members for their support during the year, particularly to Alison Joyce who is our main contact with the membership and who also manages our accounts.



National Fungus Day is an annual event held once a year where Regional Fungus Groups such as ours can promote themselves and raise awareness of the diverse and interesting world of mycology to the general public. These are some photographs from the LFSG efforts at the University Botanic Gardens, Leicester.



## Food for Thought

By Concepta Cassar

***“Therefore I give my simple advice unto those that love such strange and newe-fangled meates, to beware licking honey among thornes, least the sweetness of the one do not countervaille the sharpnes and prickling of the other.”***

**– John Gerard, *The Herball or Generall Historie of Plantes*, 1597**

There are few people out there who will share my enthusiasm for the gathering grey skies that have come to define the last couple of weeks. As balmy summer days picking canalside raspberries give way to the familiar damp of insolent British drizzle, my mounting excitement has been difficult to hem in. Pulling on my wellington boots, I know that the arrival of rain after a warm summer can only mean one thing: mushrooms.

I am what Lorna Bunyard once referred to as “a confirmed toadstool eater”[1], always keeping half an eye out for these mysterious fruits of the earth. It is no wonder that Mrs Bunyard’s chapter on mushrooms should follow a chapter entitled *Strange Meats*, however, as this is, historically, how they have been perceived by the British. John Gerard, perhaps our most revered botanist, was certainly not a fan, affirming that they “do hunger after the earthie excrescences”[2] – an association he makes more than once – whilst noting their habit of popping up on the “rotting bodies of trees” in “dankish”, “shadowie”[3] places. Gerard dismisses fungi as “unprofitable” and “nothing worth”[4], repeatedly warning the reader that they are “full of poison” and “deadly”[5].

Of course now we know that this isn’t actually the case. Of the 3,000 or so species of fungi that can be found in the British Isles [6], only around twenty are gravely poisonous (though many more are too tough or bitter to make for desirable eating) [7]. Though these poisonous species sometimes resemble and mimic the habits of edible ones – making careful examination an important rite of any foray – this does not quite explain why the British are so sceptical about fungi. It was not until the war years that the British public “came to realize that not only the mushroom, but other fungi also ... were edible, nutritious and palatable”[8], and certainly not until this century that we started in earnest to explore varieties other than *Agaricus bisporus* for their culinary possibilities.

British cultural aversion to these *new-fangled meates* [9] is evinced by Gerard’s description of the treatment of puffballs. Where in other countries they were renowned for their culinary value, in sixteenth century Britain, “the people where they grow [were] constrained to dig them up and cast them abroad like Molehills”[10], or “set [them] on fire” to “kill and smother Bees” [11]. This strange violence towards fungi is something that I see regularly on my walks, where some poor, unsuspecting fungus pops its head up, only to be raked over or kicked to pieces by a passing tyrant. More often than not, these species are edible, and leave me feeling as though I’ve been deprived of a free, succulent morsel.

By comparison, many early creation stories, from South Africa to the Philippines [12][13], feature mushrooms as a metaphor for the beginning of the world. Other world cultures have long enjoyed the bounty that the fungi have to offer, with mushroom foraging forming an integral part of economic and social activity in many societies. In mainland Europe their importance can be seen throughout history, from Lorenzo de’ Medici’s verses dedicated to cheerful women gathering mushrooms in verdant meadows [14], to the earliest attempts by the French to cultivate them in 1707 [15].

Even our most cherished, forward-thinking writers are subject to this prejudice – with Shakespeare’s Prospero deriding the “green sour ringlets” of “midnight mushrumps” that the fairies make, alluding to the erroneous folklore that livestock will not graze where poisonous mushrooms lie [16]. Only thirty years later in France, Molière named perhaps his most famous protagonist after the delectable, subterranean truffle, or *Tartuffe*. For all his pastoral sensitivity, even Keats fails to see virtue in the mycological kingdom, describing its denizens as “night-swollen” [17] and “cold” [18] two centuries later.





Fortunately, by the time Victoria had ascended the throne, someone had come to defend the virtues of these hidden riches in the form of Rev. Dr. Charles David Badham. Badham learned of the value of edible fungi whilst practising medicine in France and Italy, and, having noted the nutritive, culinary and economic benefits that they could offer – particularly to the most disenfranchised in society [19] – published *A Treatise on the Esculent Funguses of England* in 1847. The volume is informative and witty, and even if some of the information contained in it has been improved upon since, will still prove an interesting read to the amateur mycologist. In the volume, Badham notes how strange it is that we are so fearful of fungi when we regularly eat of a genus renowned for its poison, *Solanaceae* [20].

Luckily, the fate of fungi is slowly changing in the UK. The determined efforts of a few intrepid people, from Victorians and twentieth century Bohemians, to the UK's rich and diverse immigrant populations of which I am a part, finally seem to be paying off. Only this year did Dr Paul Thomas harvest the first cultivated truffle in Leicestershire [22]. Hopefully our interest in these delicacies will encourage us to afford greater protections to the hedgerows and woodland in which they thrive, and will inspire us all to go in search of the more common place treats growing closer to home.

#### References:

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- [3] *Ibid.*, 1386.
- [4] *Ibid.*
- [5] *Ibid.*, p.1385.
- [6] Phillips, Roger, and Lyndsay Shearer, *Mushrooms And Other Fungi Of Great Britain And Europe* (London: Pan Books, 1981), p.6.
- [7] Mabey, Richard, *Food For Free* (London: Collins, 2007), p.182.
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- [10] *Ibid.*
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- [18] *Ibid.*, p.91.
- [19] Badham, David, *A Treatise On The Esculent Funguses Of England* (London: Lovell Reeve), 1863, p.viii.
- [20] *Ibid.*, p.39.
- [21] *Ibid.*, p.150.
- [22] 'First UK-farmed truffle harvested', *BBC News*, Aug 18 2015.



## Indoor Meeting

October 2014

By Richard Iliffe

Our autumn indoor meetings are sociable gatherings when we invite members to bring collections in from their home locality. The specimens are laid out on tables in some sort of order - brackets, agarics, puffballs etc. The agarics are then arranged in groups according to presumed spore colour, and further subdivided into genus if possible. The leaders then discuss the finds in sequence, explaining the features that enable them to be placed into groups, then into a genus and, if the characters permit, into species. The aim is to introduce identification features at a basic level, both to help and guide beginners and to serve as an early-season refresher for the more established members.

Invariably some unfamiliar fungi are brought into these meetings and, even if they can't be resolved on the spot, the discussion that follows raises interesting points and all can leave the meeting feeling that they have discovered something new. Collections unidentified at the meeting are taken away for a more detailed examination and the results are then passed back to those who found them.

At this meeting in October 2014 the challenges included a beautiful cluster of yellow toadstools, looking superficially like Sulphur Tuft. The spore deposit however was a rusty brown colour, not at all like the very dark brown spore colour of Sulphur Tuft. They had been collected by Geoffrey Hall at Aylestone Meadows and they were identified as *Pholiota alnicola*, the Alder Scalycap, a species not common with us, and one that could so easily be dismissed as Sulphur Tuft from just a cursory glance.

Another find that prompted much discussion had been collected from a small private woodland near Market Bosworth. The caps were a pale creamy brown colour and rather irregular, thought at the meeting to be either *Lepista* or *Lyophyllum*. When re-examined the following day the obvious clue, which not been noticed at the meeting, was that the flesh in the stem bases was dark in colour, suggesting *Melanoleuca*. They were *Melanoleuca grammopodia*, which is not at all common locally.

Among the many smaller brown jobs on the table was a *Conocybe* with a ring on the stem, found in Pete and Janet Sykes' garden. This was confirmed as *Conocybe arrhenii*, a commonly found autumn species. The European taxonomists have moved these *Conocybe* with stem rings into a new genus called *Pholiotina*, not because they have a ring but because they have different gill-edge cystidia from other *Conocybe* species. I am sure it will only be a matter of time before we follow suit in the UK.

I had done some collecting in Burbage Wood earlier in the day and had been pleased to bring several of the genus *Pluteus* to the meeting. As well as the very common Deer Fungus *Pluteus cervinus* I collected *Pluteus hispidulus*, which has very small brownish velvety caps. Another insignificant looking brown species was thought to be an unusually small Deer Fungus at the meeting. Closer examination the following day revealed that it had erratic and rather faint dark margins to some of the gills. It proved to be the first Leicestershire record of *Pluteus luctuosus*, and left me wondering whether this species could perhaps be over-looked as the coloured margins were difficult to see, even with a hand-lens.

***“Invariably some unfamiliar fungi are brought into these meetings and, even if they can't be resolved on the spot, the discussion that follows raises interesting points”***

Other finds that stimulated interest were the attractive red-bleeding *Mycena haematopus*, which has been given the English name of the Burgundy-drop Bonnet, and a large oyster-shell shaped species, thought to be too large for a *Crepidotus* but later identified as *Crepidotus mollis*, an unusual species because it has a gelatinous layer in the cap flesh and a skin that can be completely peeled from the cap; features that are not immediately obvious on first examination.

These meetings are a very satisfying way to introduce fungi to newly joined members and they give them confidence to name a few common species, as well as revealing that even our most experienced members are not infallible and can struggle when faced with identifying up to a hundred species in a couple of hours early in the season!

**NOTE: Meetings start at 7.30pm with doors open from 7.00pm when tea and coffee will be on offer for a small donation. Visitors are very welcome and may attend at a charge of £2 per meeting. Please check out the LFSG website for dates and what meetings are planned**

**[www.leicsfungi.btck.co.uk](http://www.leicsfungi.btck.co.uk)**





## New and Interesting Records 2013-2015

By Tom Hering

Only a few years ago, we could expect to record a new species for Vice-County 55 at almost every foray. But as the number of species known to us has steadily increased (it now exceeds 2000), the inflow of previously unknown ones has correspondingly slackened. In fact, our members have recorded only fourteen new species in these three years. We should therefore be very grateful to an outsider, the ascomycete expert Peter Thompson, who made flying visits to two sites near Leicester – Narborough Bog and Lucas Marsh - and has recorded a remarkable number of small ascomycetes, of which 74 are first records. It is a pity that he prefers to work alone, and not to share his expertise with companions, in the way that we like to do at forays. Still, we thank him for all the new records. It would be tedious to try and list all his finds here, but they can be found in the county checklist (now on the website). All the species recorded there from Lucas Marsh, and all recent records at Narborough, are by Peter Thompson.

Our own new records include one myxomycete, *Diachea leucopoda*. The rest comprise six ascomycetes and seven basidiomycetes. The most interesting ascomycete is the alien *Paurocotylis pila*, sometimes called the New Zealand Truffle (Fig.1), found at Aylestone Meadows in 2015. First recorded for Britain in 1990, it now has 30 records in the BMS database, many of them from Yorkshire. *Ascotremella faginea*, found at Blacksmith's field in 2015, has jelly-like fruit bodies that might be mistaken for an *Ascocoryne*, but the spores are smaller, and always aseptate. The national database has 100 records of this fungus on various kinds of hardwood, but our record is the first one on gorse! We are indebted to Richard for the other new ascomycetes, which include two dung fungi (*Sordaria humana* and *Sporormiella minima*); a fire-site fungus (*Ascobolus carbonarius*); and the water-mould *Dendrospora erecta*, which is an ascomycete anamorph.



On National Fungus Day in 2013, Michael Dobson brought in a specimen of *Hericium coralloides*, known as Coral Tooth. This spectacular-looking fungus is not very uncommon nationally, but we have never had it before. Then there are two toadstools that are really not uncommon, but still new to us. These are *Lactarius fluens*, a companion of beech, from Gilroes Cemetery; and at Hicks Lodge *Mycena bulbosa*, which grows on rushes in wet places. We are indebted to Peter Smith for two *Lepiota* species; *L. Fuscovinacea* at Grace Dieu; and *L. hymenoderma*, which is a real rarity, at Cropston. Another relatively rare fungus is *Ramaria decurrens*, found by Richard at Bosworth.

**LEFT: *Paurocotylis pila***



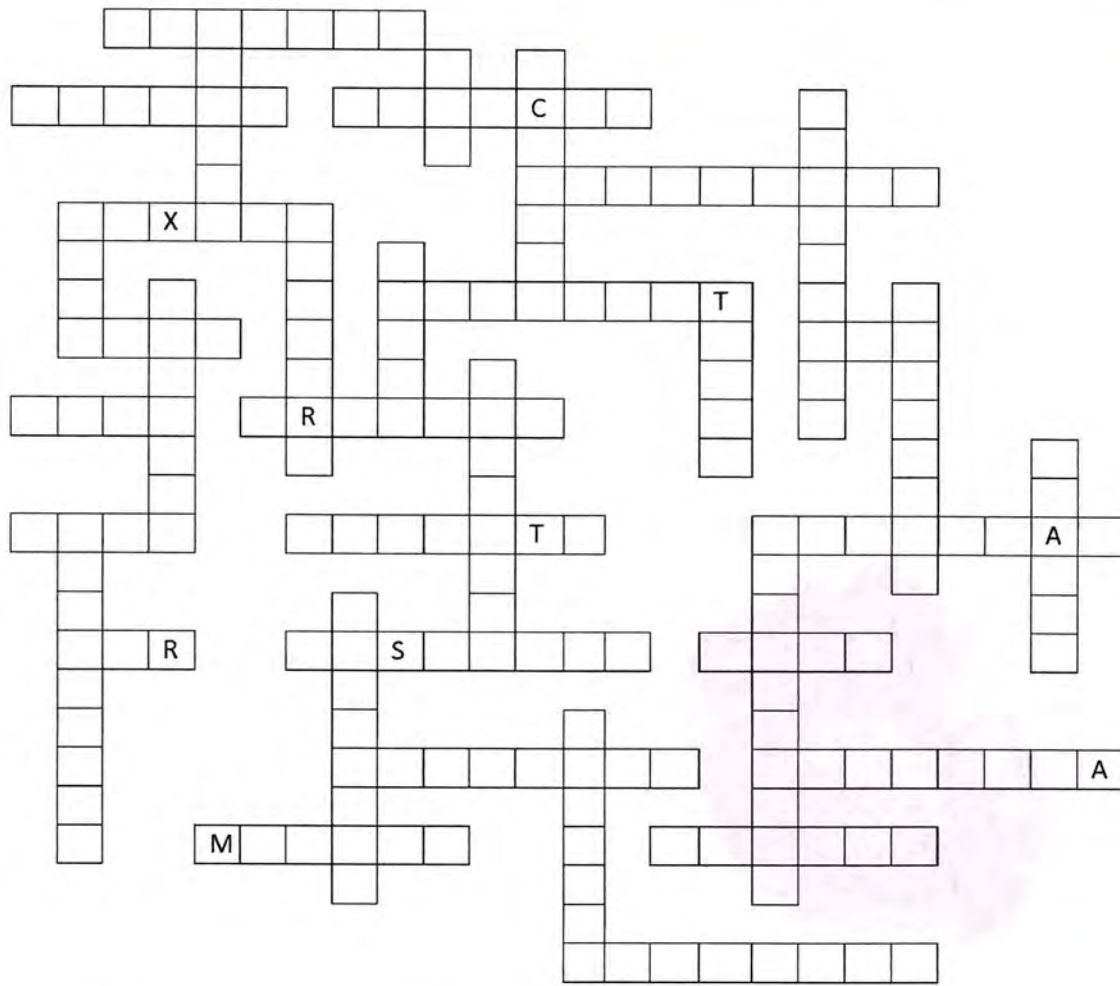
There are also quite a few 'second or third records'. An intriguing one is *Dacrymyces minor*, found at Priors Coppice in 2016. It differs from the common *D. stillatus* in being paler, with thin-walled spores. Our only previous record was one made in the 19<sup>th</sup> century. It was found by Rev. A. Bloxam, vicar of Twycross, and identified by the great Berkeley. Finally, we were pleased to see *Pluteus aurantiorugosus* at Grace Dieu. This is positively the only bright red agaric that grows on wood. But the Grace Dieu specimen was not very handsome; Fig 2 shows a better find of the same species from Dorset.

**LEFT: *Pluteus aurantiorugosus***

# KeyWORDS

Fit All The Fungi Related Words Into the Grid

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INKCAP

BLUSHING

WOOD

DEATHCAP

EAR

BRACKET

MUSHROOM

AMETHYST

PEPPERY

AMANITA

PUFFBALL

SPOT

SHAGGY

MILLER

BEEFSTEAK

FLY

DUNG

AGARIC

ROUNDHEAD

LACCARIA

WAXCAP

TAWNY

STAINER

DECEIVER

MAGIC

GRISSETTE

SCARLET

MILKCAP

TAR

DEAD

MANS

FINGERS

ANISEED

DAPPERLING

FUNNEL

STINKING

EARTHSTAR



## Cloud Wood Forays

November 2014

By Richard Iliffe

Cloud Wood is always an interesting site to visit. Formerly an ancient woodland that was clear-felled during the Second World War, it adjoins the working quarry at Breedon that extracts limestone for the road-stone industry. Waste from the quarry has been spread over parts of the wood giving the soil a calcareous content that influences some of the flowering plants and the fungi that we find there.

Our mid-week foray on 5<sup>th</sup> November 2014 gave us sixty-five records, which is quite good for a two hour walk. Some of the finds were unusual and we had at least one new county record, *Ascobolus carbonarius*— a small orange-brown discomycete growing on burnt wood, identified later by Peter Smith and illustrated here by his photograph.



*Ascobolus carbonarius* -  
Cloud Wood

Photo by Peter Smith

As we entered the wood along the narrow track we came across a beautiful example of the Tufted Brittlestem *Psathyrella multipedata*, and a few yards to one side there was a spectacular group of the Trooping Funnel, *Clitocybe geotropa*, all in perfect condition. The photographers in the group took full advantage of these attractive fungi that really justify the name 'Funnel Cap'.

Many *Entoloma* species can be superficially rather similar, making them difficult to identify, so it was a surprise to record four different species on one visit. One that can usually be named in the field is *Entoloma sericellum*, the Cream Pinkgill. This is usually a very pale yellow-cream colour, though our finds were almost pure white. Some of them looked rather strange as they had obvious pink gill margins. We decided that this could have been caused by the spores on the extreme margins ripening ahead of those on the gill faces – something we have never come across before, but we could think of no other explanation. We also identified *Entoloma sericeum*, *E. cetratum* and *E. hebes*.

Another species that can sometimes be recognised in the field is *Inocybe rimosa*, the Split Fibrecap, but those we found here were whitish with a central yellow papilla. They were scattered over a wide area under birch and hawthorn trees. Although the appearance was unusual the distinctive microscopic features enabled us to confirm the identification. We also found the pure white *Inocybe geophylla* growing nearby, together with its lilac form, which some believe to be a separate species though we have doubts as we invariably find the two forms growing together in a loose grouping.

Often the smaller finds can be strikingly attractive and this is so with the little blue-grey oyster-shell shaped fruit-bodies of *Resupinatus applicatus* which grow in clusters on rotten wood. They are seldom recorded but may be overlooked as they are very small and unobtrusive.

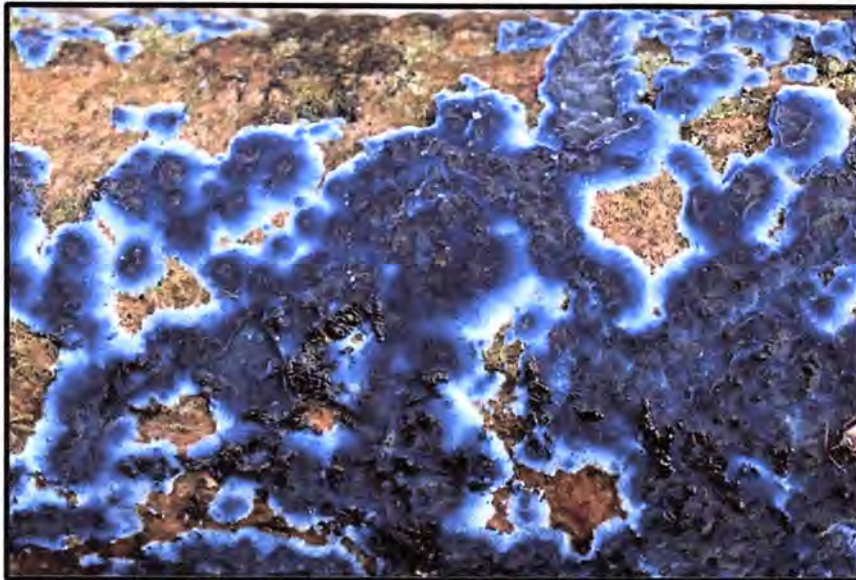
Among the non-gilled fungi we were pleased to record the Pipe Club *Macrotyphula fistulosa*, growing in woody litter. We have seen it on a number of our forays this year and seems to thrive later in the year in consistently damp conditions. Another of the Club and Coral Fungi, though not closely related, was *Clavaria tenuipes*, having small white spindles with slightly swollen tips. We had very few previous records of this species in Leicestershire & Rutland.

When we made a second visit to Cloud Wood on 23<sup>rd</sup> November one of our first finds was *Clavaria acuta*, the Pointed Club, very similar in appearance to the above but, as the English and scientific names suggest, this species has pointed ends to the spindles. Our return visit to the reserve was made because the weather had remained very mild all through November, and because we had found so many unusual species on our first visit. We hoped that by looking at different areas we might increase the species list for the year. We were not disappointed and we again found some very interesting species, some of them new to Leicestershire.

One of these was a large cluster of *Crepidotus* found on a fallen twig. We had collected several examples of the rather common *Crepidotus cesatii* and initially thought that this was just a larger version of that species, with several caps measuring between 2.5cm. and 3cm. across. On checking the reference literature it appears that very few of the genus have caps exceeding 1cm. Further study revealed that this was *Crepidotus lundellii*, a species new to the county.

Yet another county first was a small *Inocybe* that had a lilac tinge to the stem and brown scales on the cap. It was identified as *Inocybe griseolilacina*, which the writer has seen occasionally in the Forest of Dean where it is usually found in litter under beech trees. However, it can associate with most hardwood trees and our collection was under a mix of **sallow, birch** and hawthorn. We recorded a number of species not seen on our earlier visit, none of them particularly rare. We were surprised, however, to find late fruitings of the beautiful Scarlet Elfcup, which we expect to see here in early spring. These were checked microscopically and found to be the seldom recorded *Sarcoscypha coccinea*, which was another county first. This begs the question whether we should check our finds of the almost identical *Sarcoscypha austriaca* more carefully – the only way to separate them is to check the type of hairs that grow on the outer surface of the cups.

Towards the end of our visit there were excited calls which brought most of the group back to look at some startling blue fungal growths on standing dead ash wood. They looked unlike any usual fungus but were recognised as the Cobalt Crust *Terana caerulea*, which is reported to be a species favouring the milder climate of the south-west of the UK. It was in fact our second county record as it had been found a year or two earlier in **Burbage Woods**, but that had been a small growth only a few centimetres long on an old fence rail. Here the ash branch carrying the fruiting growths was well over a metre in length and provided the accompanying spectacular photograph.



*Terana caerulea* –  
**Cloud Wood**  
**Photo by Richard Rogers**

This was an excellent find on which to end our visit and we returned to our cars feeling that the morning visit had been very worthwhile. However our records were not quite complete as we found several deposits of *Mucilago crustacea*, the well-named Dog-sick Slime Mould, growing on coarse grasses in the verge just outside the wood. These can occur quite frequently during prolonged damp conditions and often cause public concern, though they are completely harmless and cause no damage at all to the grasses on which they appear.

## Foray to Coleorton Wood

19<sup>th</sup> October 2014

By Richard Iliffe

We were quite a small group at Coleorton Wood, which in many ways can be an advantage as a small group tends to stay together and those attending get to see all the finds. The very first collection, one solitary specimen of *Suillus luteus*, was made by Andrew Swift near the car park. This pine tree associate is commonly known as Slippery Jack because of the very slimy brown cap surface. It is an unusual *Bolete* as it has a ring on the stem which is coloured cream with deep violet tinges.

Alison was in good form and several of the early finds were due to her sharp eyes. The first was a small pale orange coloured species found on the grassy path just inside the entrance gate and looking rather like a *Mycena*. It was in fact a 'Conecap' and identified later as *Conocybe siennophylla*. Two more similar looking fruit-bodies were collected nearby and thought to be the same species. However they proved to be a different *Conocybe* but they had to be abandoned as they had started to decay and the microscopic features could not be seen clearly.

We were still only just inside the entrance to the wood, and we found a small cluster of yet another *Conocybe* species. This was a more typical looking Conecap, having a pale rusty brown colour, and the caps were larger than those of the earlier finds. This one proved to be *Conocybe macrocephala*, a first county record, though reported to be not uncommon nationally. *Conocybe* species as a whole are difficult to identify so some quite common ones may be under-recorded.

Alison's next find was a small *Mycena* growing among moss on the base of a small birch tree. It was an unusual pale yellowish-grey colour and when checked at home it proved to be *Mycena mirata*. We have had two previous records in the county but it was a new species for me, which is always pleasing.

The next find prompted excited calls from deep in the undergrowth. Somebody had found a group of small strange looking greenish growths among moss under sapling trees of willow and birch. When brought out into the light for examination they proved to be *Leotia lubrica*, known as 'Jelly Babies' due to their likeness to the gelatinous sweets that we remember from childhood. We have few previous records of this species, which is more usually found in beech woods though they are reported to associate with range of hardwoods.

By this time we had been foraging for the best part of an hour and were still only fifty yards or so along the entrance track. We decided on a change of habitat so we made a quick walk to the far end of the wood to visit a larch plantation. We soon found one of our all-time favourites, Plums and Custard *Tricholomopsis rutilans*, a species that is reliably found here every time we visit. There was also a single specimen of the False Chanterelle, *Hygrophoropsis aurantiaca*, in perfect condition and looking very beautiful. We next came across a cluster of rather dull looking caps with decurrent gills and a strong mealy smell that were identified as *Clitocybe ditopa*, the Mealy Frosted Funnel, which favours conifer woodlands. This is quite easy to name in the field and a reminder of how important smell can be when trying to name fungi.

As the morning progressed we turned back towards the car park along a wide grassy ride and came across an old bonfire site on a bank to one side. I looked over it and saw nothing, but Rob Joyce spotted some very small obscure grey-brown fungi that closely matched the colour of the burnt soil. These proved to be *Tephroclybe ambusta*, a species that is specific to that particular habitat. This was another first for me and I was very pleased to see it, though it had been recorded elsewhere in the county several times before.

This area of woodland, planted on a former colliery site some thirty or so years ago, is proving to be one of our most interesting foray venues, and we look forward to visiting it regularly in future years.



**LEFT: Plums & Custard (*Tricholomopsis rutilans*)**  
Photo by Rob Joyce

## Psychology and Poisonings

By Robert Joyce

Nature is a careful balance of opposites and this is true also in the Fungi Kingdom. There are mushrooms that are edible and can provide nutritional value (mainly in terms of protein) and there are mushrooms that are poisonous, that are deadly if eaten. Throughout the foraging world there are people who are keen to collect specimens for their evening meal, knowing the risks that can be associated with this. Also there are people who are scared to touch any fungi, knowing that some fungi can kill. Everyone else falls between the two. Every year there are unfortunately deaths around the world from mushroom poisonings. These range from young children who accidentally eat them through curiosity, to misidentification by foragers for food who mistakenly believe they have only edible specimens.

It is basic common sense to take no risks when dealing with anything that has the potential to kill you. The most deadliest of fungi without a doubt is *Amanita phalloides*, which earns its common name of Deathcap for a very good reason. The symptoms start off as gastrointestinal, stomach pain, diarrhoea and nausea which last for a few days. This is followed by a period of feeling better but during this time the toxins are attacking the liver and kidneys, which eventually ends in organ failure. Death generally occurs six to sixteen days after the poisoning. The brief period of feeling well again is the unnerving symptom. Victims of Deathcap poisonings might just suspect that they had a 24 hour stomach bug at first, which would mean a delay in seeking potentially lifesaving treatment. There are other species just as deadly but there are also a huge number of poisonous fungi, that although survivable, cause numerous illness and harm.

It seems obvious then to just learn the characteristics and features of the poisonous fungi and avoid them. Well again it is not that simple. The problem is that for every edible species there is a poisonous one which resembles it. Likewise for every poisonous fungus there is an edible looking fungus. A lot of fungi is notoriously difficult to identify especially in the field. Many times two or more Mycology experts, debate over a species in the field. It is not until careful microscope work (or even DNA methods) are undertaken that a definite identification can often be made. Fungi characteristics can also vary considerably with weather conditions, age, location etc. The genus *Laccaria* are known commonly as the Deceivers for a very good reason. The same species can be different colours on different days. And this is just an example of how difficult it can be.

Just stop and think about this for a moment. Fungi can differ from the features you might read about in books and even the experts who have spent years studying them for a living can be unsure. And a mistaken identification can lead to death. Again common sense dictates that you should not take risks especially when this is taken on board. It is understandable then that people fear mushrooms. The argument has also been put forward by people that surely there are some species that are so distinct that they are certain to be safe to consume and they have used the analogy of blackberries. The argument here being that there are many poisonous berries but blackberries are so distinctive that nobody could mistake them.

The fungi kingdom and plant kingdom are very different. Plants have flowers and fruiting bodies that are often quite distinctive when used in conjunction with other characteristics enabling good identification. Fungi is more difficult as discussed, poisonous and edible species can look almost identical. As a thought experiment think about this. A new species of blackberry appears that is deadly poisonous and only could be identified by a small ring that grows around certain parts of the bramble. A few unfortunate deaths occur and the press reports this, calling them the "Deathberries". How long would it be before we saw fewer and fewer bramble pickers? The same feelings would occur as with fungi now and rightly so.

So should people be scared of fungi? Maybe, after reading the potential dangers, respectful is a more appropriate word. It is said that trends of TV cooking programs have encouraged people to look for free food in difficult financial times and that this has led to a rise in fungal poisonings. In contrast to that though there have been several recent television dramas that have used poisonous mushrooms as a murder weapon showing how deadly fungi can be. There is definitely a psychological aspect to them that seems to split people. Some people would refuse to touch a stinkhorn egg being passed to them by a professor in mycology who has successfully identified it one hundred percent. In contrast to this, despite knowing how dangerous eating a poisonous mushroom could be, the average fungi forager for food is enthusiastic and excitable when searching for specimens.

It is important to be respectful of each type of person and to always inform, educate and teach people the facts, which forms the LFSG constitution. The more cautious individual can consume their mushrooms from the supermarket (or more specialist mushroom shops if they require something more exotic) whilst the forager looks elsewhere in the field. With regards to the latter respect must be undertaken due to the dangers involved. The best passage I have found to demonstrate this is by Elio Schaechter in his book "In the Company of Mushrooms" 1997, in which he says:

"How can you tell a poisonous from an edible one?" The answer is: "With difficulty." There are no reliable rules. No generalisations applies in every case, least of all the old saws that poisonous mushrooms make silver spoons turn black or that a mushroom that can be peeled is edible. The most poisonous of all mushrooms, the deadly amanitas fail both tests entirely. What makes mushrooms insidious is that many of the poisonous kinds resemble edible ones. A little bit of knowledge is a dangerous thing: anyone intending to eat a mushroom must know it is safe with certainty. Just being "pretty sure" is recklessness".

Whatever your interest is in fungi, enjoy them but above all be safe.



## Choke Fungi

By Geoffrey Hall

While I was recording with Helen Ikin & Steve Woodward in some grassland near Saxby airfield in late May, I noticed an unusual grass with a very long, malformed ligule, which, on closer examination turned out to be a fungus, growing in a collar around the grass leaf and stem.

In fact, this was the fertile part or stroma (a mycelial cushion) of an Ascomycete fungus in the genus *Epichloë*, commonly called choke fungi, which have a complex relationship with both their grass host and with insects. It is an endophyte: it grows through the cells and tissues of its host plant, causing it little or no damage, and is highly specific. It is found in scattered patches some distance apart because of its interesting reproduction method.

Young white collars that form early in the cycle turn yellow or orange later, as spores develop. The infected grass becomes more robust and vigorous, because of increased tiller production, and may have increased drought tolerance. The fungus produces alkaloid toxins similar to those produced by ergot of rye, such as ergovaline, that make it less susceptible to grazing by herbivores. These toxins can have serious effects on sheep and cattle e.g., producing 'ryegrass staggers' when animals ingest infected Perennial Ryegrass (*Lolium perenne*). Other toxins, such as lolines and peramins, deter attack by a wide range of herbivorous insects.

The stroma forms around the grass stem at the point where its flowers are formed, so they fail to develop, which reduces flowering and seed production. Hence, the common name "choke fungus" reflects the sterilising or choking of an infected grass, and is commercially important to grass seed producers ('Choke Disease').

Many species of *Epichloë* are heterothallic and so have two mating types which are self-incompatible, so cross-fertilisation is essential for sexual reproduction. However, the reproductive cells (called spermatia) cannot move, so the fungus relies on an external agent, a fly in the genus *Botanophila*, usually *Botanophila phrenione*, to transport them from one stroma to another. When the fly lands on a stroma, it feeds on the hyphae, ingesting the spermatia produced on the surface, and may also lay its eggs which subsequently hatch into larvae which also feed on the stroma. Later, when the fly visits another infected grass to feed, it excretes the spermatia on to a stroma on that grass during a further bout of egg-laying. The spermatia and hyphae fuse, cross-fertilisation occurs, and sexual spores are then produced within perithecia inside the stroma. However, about 40% of the perithecial stroma is eaten by the developing fly larvae, a high cost to the fungus, although some of the larvae may be affected by the toxins it produces. Mature ascospores are ejected from the perithecia, enabling the fungus to spread to new locations, where they infect seeds of other grasses flowering nearby. The grass seed carries the fungus which subsequently develops inside the new growing plant as an endophyte until conditions are right for development of a stroma and continuation of its life-cycle. The fungus may also spread via vegetative growth of the plant (which can be extensive in some species of *Agrostis*) or by infecting seeds that have been produced by plants where a stroma has not formed, and which then grow through the seedling after germination.

It had been thought that there was only one species, *Epichloe typhina* but DNA evidence has shown that more than one species is present in the species complex, and that the fungus is often host specific. Consequently, most British records for *Epichloë* are of *E. typhina* but Spooner and Kemp (1995) provided a key to 6 species of *Epichloë* (*E. typhina*, *E. festucae*, *E. baconii*, *E. clarkii*, *E. bromicola*, *E. sylvatica*). A seventh species, *E. elymi*, requires confirmation in the British Isles.



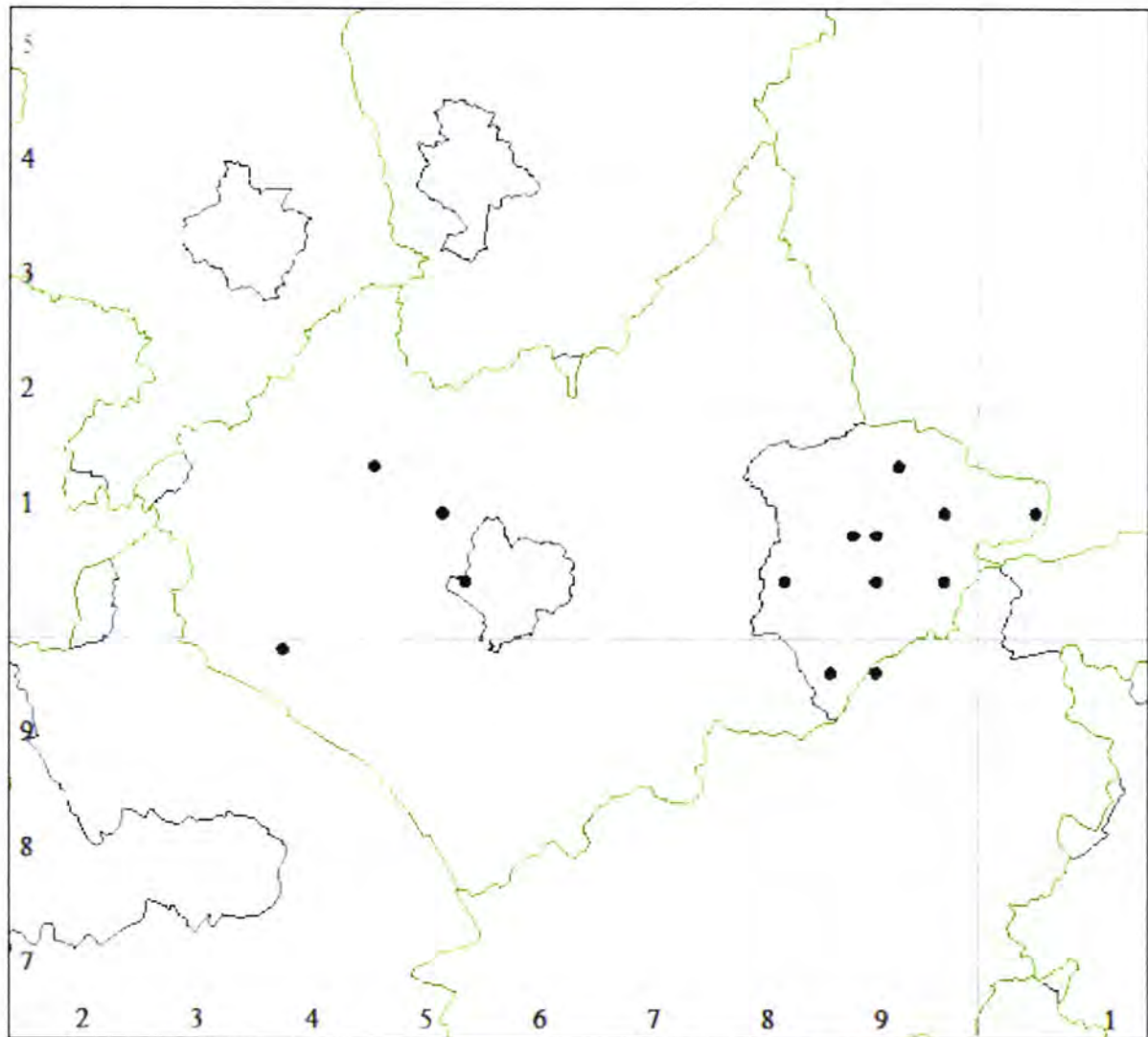
**"the common name "choke fungus" reflects the sterilising or choking of an infected grass"**

***Epichloë typhina* in Western Park, Leicester.  
Photo by Graham Calow.**

These fungi are quite conspicuous (i.e. can be seen without glasses on) during the late spring and summer, which also extends the traditional mycological season a little. In vc55, there are 18 records for *Epichloë typhina* in 14 tetrads, 10 of which are in Rutland. I don't think that the fungi are more common in Rutland, but that the recorders there are more active: Roy Lemmon and Linda Worrall have produced 11 of the 18 records. All the records have been of *E. Typhina* and it is not known whether any of the five other species are present in the county. To identify the fungus accurately, the grass host must be identified which may explain why only 3 of the 18 records have associated grass identifications (*Holcus mollis*, *Arrhenathe rumelatus* and *Brachypodium sylvaticum*), as many grasses are difficult to identify without flowers. If members find choke fungi on grasses, I am happy to help with grass identification from specimens with a flowering culm, (not photographs please)

References:

[1] Spooner, B.M. & Kemp, S. (2005). *Epichloë* in Britain. *Mycologist* 19: 82 – 87.



**Distribution of *Epichloë typhina* in vc55 to end 2015.  
Records plotted at tetrad resolution.**





## The Wonders of DNA

By Tom Hering

Nowadays, even quite young school children are taught something about DNA, which has been one of the landmark discoveries of the 20<sup>th</sup> century. It is not a single substance, as it can exist in literally millions of different configurations. In life, it exists as a coiled pair of long-chain molecules – the famous 'Double Helix'. We now know each chain is a long, long string of sub-molecules, all similar except that each unit contains just one of four distinct nitrogen bases. It can be thought of as resembling a string of beads of four different colours. The exact order of these is all-important, since it is this code that, translated in an appropriate cellular environment, specifies the making a whole organism, which might be an elephant, or a foxglove, an *Amanita*, or any other of the world's many species. Remarkable stuff indeed! Over millions of years, organic evolution has proceeded by successive stepwise changes in the DNA sequence, with many millions of consequent small changes in the resulting organisms. By comparing the sequences in DNA samples of diverse origin, it is possible to work out the ways in which present-day species are related to each other by descent. Intensive study of DNA is going on in universities all over the world; when this is complete, the architecture of the 'tree of life' may one day become almost as fully known as is the genealogy of all the descendants of Queen Victoria.

All this high-powered science may seem a long way away from the sort of study that local groups like ours can undertake, but DNA studies are already having an impact. Among the fungi there are many groups where we do not know whether there is a single, highly variable, species, or a complex of related species that closely resemble each other. Comparisons of extracted DNA are a very powerful tool in answering this kind of question. It is obvious that local enthusiasts can play an important role in furnishing the specimens on which such a study must be based. But in the future they may be able to play a more important part than that. At the Group Leaders Meeting in 2016, a project on *Hygrocybe conica* was described by David Harries of the Pembrokeshire Group. This Blackening Waxcap is well known to be variable; several distinct varieties have been proposed, and some authors, such as Moser recognise a second species (*H. nigrescens*) within the complex.

There are three stages in such an investigation. In the first, material must be preserved. Some conventional dried herbarium specimens can provide usable DNA samples, but others may be unsatisfactory owing to age and a poor state of preservation. Alternatively, samples can be made from fresh fruit-body tissue by literally hammering it onto a specially prepared card, which preserves the DNA, more or less in perpetuity. This means that samples collected at different times can be stored together, for analysis at any time in the future. When a sufficiently representative range of sample has been obtained, one goes onto the second stage. The DNA is extracted into liquid from preserved material. In addition, making use of its marvellous property of coding for copies of itself, the amount of DNA can be doubled by copying, and this can be repeated many times, to increase the amount of material for analysis. This process, which includes repeated heating and cooling cycles, is known as PCR (Polymerase Chain Reaction). It is also possible to select the type of DNA being copied – e.g. that from Basidiomycetes – by using selected short sequences of DNA. The resulting preparation of DNA is then purified further by electrophoresis. One might think that the necessary bits of apparatus must be very expensive, but in fact University College, London can supply a complete kit for this purpose, called Bentolab, for about £700. So, for a local group that is sufficiently motivated, this stage is within their grasp.

The third stage is the elucidation of DNA sequences, with a view to comparing those derived from species that are believed to be closely related. The techniques, which may include the use of fluorescent labelling, have been advancing very rapidly. This whole field is outside the capacity of amateur scientists, and is the preserve of biotechnology laboratories. Many of these are in universities, but there are also commercial concerns, such as those that assist the police. Individual sequences are becoming less expensive to determine, but only through having large, complex machines that can process large numbers of samples. We are on the verge of a new era of cooperation; amateur groups will depend on laboratories to sort out tangles of related species, while the laboratories may well be pleased to find a practical problem on which to practise their newly-developed skills. The Pembrokeshire project, mentioned above, is associated with laboratory work going on at Aberystwyth University.

What will be the effect of all this high powered science on the activities of recording groups like ours? On the down side, we must expect to be told, quite often, that a species which we are quite used to recognising in the field with complete confidence, is actually one of a number of 'look-alikes', that can be separated by DNA studies. Sometimes it may happen that, once we know we are dealing with more than one species, we can find field or microscopic characters that will enable us to distinguish them without recourse to DNA. But there is a positive side too. One species or more than one? We no longer have to just rely on the opinions of experts – DNA studies can usually provide a definite answer.

I must thank Derek Schafer, the Inkcap expert, for assistance in preparing this article.



## Fungus Question Time

By Richard Iliffe

We occasionally hold question and answer sessions at our indoor meetings and they always provoke very informative discussions. Here are the contributions of our 'expert panel' in response to two interesting questions:

**Question:** We have an area of new woodland of mixed native trees planted in 2000 on former agricultural land. What can we do to encourage fungi?

**Answers:** With a newly planted wood it is important to wait and see what develops naturally. It would help if old timber was brought in from other sites and left to rot down. If there is a good local source of rotten wood try to create log piles as these will produce fungi and will also encourage invertebrates and small mammals. If any branches show die-back leave them on the tree, as would happen in nature. Don't spread collections of old fruit-bodies collected from other sites in the hope that spores will germinate. Following many years of spreading collections made on group forays in a private garden this just does not seem to work. If tempted to try this in a garden setting remember to exclude any form of Honey Fungus from your experiments!

In earlier times *Coprinus* or *Agaricus* species could be introduced by importing mature horse dung from a farm source and spreading it around a site. Unfortunately for mycologists, though not for horses, animals in modern stables are treated with preventative veterinary medicines that inhibit fungi in their droppings. The results will be effective as a soil conditioner but may not produce any fungi.

As an interesting aside, commercial production of edible mushrooms originated in Paris in the eighteenth century when street droppings from horse traffic were swept into manholes above natural limestone caverns beneath the city. Large accumulations of mushrooms appeared down there and were harvested. These old forms are still cultivated in small quantities by a few growers under the name 'Paris Browns'.

**Question:** Why is such a range of spore sizes produced when the tiny ones appear to be just as effective as the larger ones?

**Answers:** There is no clear answer to why some spores are small and some large – they are just products of evolution. The very smallest spores are found in some of the bracket fungi, for example those of *Skeletocutis* are the size of some bacteria and only 2 to 3 microns long.

In some cases the size of a spore may be related to the method of dispersal. Basidiospores of some rusts are wind dispersed and can be very small. Where spores are water dispersed, or ejected by water pressure, as with some ascomycete spores, they may be larger as the explosive dispersal mechanism will be more effective with larger spores. This applies particularly to some dung fungi where the spores have to be ejected a sufficient distance to land on fresh grass and to escape the unclean zone around the dung where cattle will avoid grazing.

Some water-borne fungi found in stream foam, known as the Ingoldian Hyphomycetes, have very large spores; up to 1 millimetre long in some cases. The size and, in many of them, their spidery shape, enables them to disperse in the water and to readily make contact with submerged fallen leaves. Once attached to a leaf the spore will produce hyphae which penetrate the tissues and a fungal mycelium develops within the leaf blade. Outgrowths then form on the leaf surface and these bear more spores to be released into the water.

***Please be aware that we often have "Question and Answer" evenings as part of our indoor meetings schedule which give you the opportunity to ask any questions to any of the experts and non-experts within the group. If there is no scheduled question and answer sessions planned please still feel free to ask any questions at forays or through the website. We are all here to expand our mycology knowledge so ask and hopefully we can find answers.***



## Even More on Endophytes...

By Geoffrey Hall

*Colletotrichum tofieldiae* has been found in association with the roots of that darling of the world of plant genetics, Thale Cress (*Arabidopsis thaliana*), in a mutualistic relationship that appears to confer a benefit to the plant.

The fungus lives as an endophyte in populations of *A. thaliana* growing in the wild in central Spain. The relationship is beneficial to the host because the fungus transfers the macronutrient phosphorus (most likely as a phosphate) to the growing shoots, promotes plant growth, and increases fertility, but only under phosphorus-deficient conditions. This effect is similar to that of a mycorrhiza, but, significantly, the relationship is a fungus-vascular plant mutualism, and adds to the ever-growing list of fungal endophytes discovered in plants in the past 100 years.

In evolutionary terms, the association between early land plants and fungi hundreds of millions of years ago is thought to have been one of the forces driving colonization of the land by plants, which has resulted in the diverse land flora present on the earth, and where the mycorrhizal association is found in 90% of crop species.

For the full article, see: Hiruma, Kei et al. (2016) Root endophyte *Colletotrichum tofieldiae* confers plant fitness benefits that are phosphate status dependent. *Cell*, 165(2): 464-474.

Downloadable from: <http://dx.doi.org/10.1016/j.cell.2016.02.028>

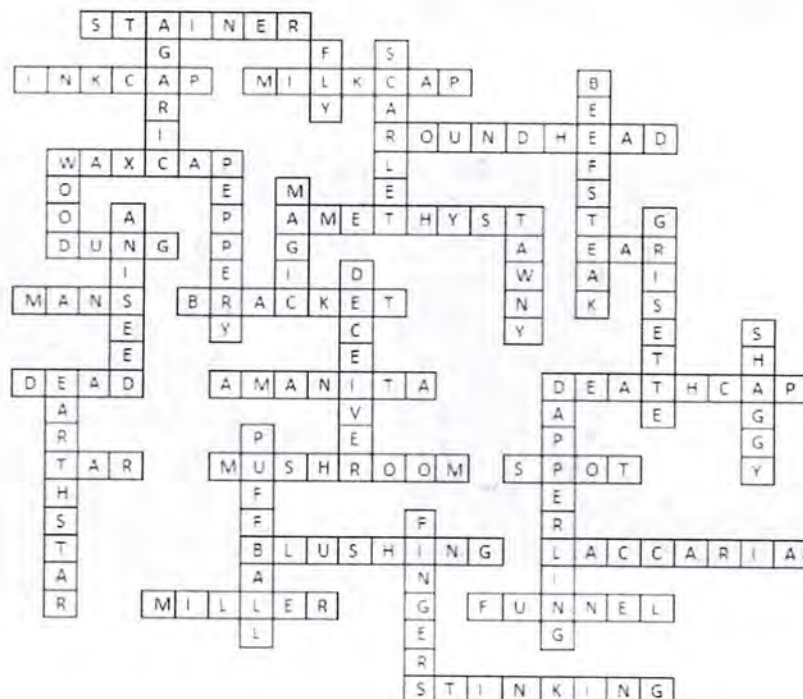
## Even More on Endophytes...

If you can't get enough of endophytes, try this review that can be read on-line:

R. J. Rodriguez, J. F. White Jr, A. E. Arnold, R. S. Redman, 2009, 'Fungal endophytes: diversity and functional roles', *New Phytologist*, vol. 182, no. 2, pp. 314-330

Downloadable from: <http://dx.doi.org/10.1111/j.1469-8137.2009.02773.x>

## KEYWORD PUZZLE SOLUTION



## PHOTOGRAPHS

A collection of photographs taken from previous fungi seasons.



Scarlet Elfcup, *Sarcoscypha austriaca* (R Joyce)



Shaggy Scalycap *Pholiota squarrosa* (R Joyce)



Coral Spot, *Nectria cinnabarina* (R Joyce)



The rare *Clavaria greletii* (R Joyce)



Wrinkled Crust, *Phlebia radiata* (R Joyce)



Unknown "Slime Mould" (R Joyce)

**EDITORS FINAL NOTE: A big thank you to everyone who has contributed to this newsletter! Rob**