Field Mycology

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Field Mycology

Field Mycology is a quarterly publication produced by the British Mycological Society, available as an open access online journal and in printed magazine format. It covers all aspects of fungal identification, recording and conservation, catering to all levels of expertise.

It focuses primarily on the wild fungal diversity of the British Isles, including the United Kingdom, the Republic of Ireland, the Isle of Man, and the Bailiwicks of Guernsey and Jersey (Channel Islands). Reports and examples of the practice of field mycology from elsewhere may also feature, where they are of relevance and interest to the field mycology community. However, articles describing taxa which are new to science will only be considered for publication if their holotypes were collected within the British Isles.

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The Editorial Team will be reviewing and updating these instructions over the course of 2025. In the meantime, authors are encouraged to look to the back issues of *Field Mycology* for inspiration and examples of typical article style, structure and formatting.

Authors are welcome to contact the Editorial Team, via the email address above, with any pre-submission enquiries. In the case of articles dealing with taxa that are new to science or new to the British Isles, the Editorial Team requests that a pre-submission enquiry is made in advance of submitting the manuscript, so that consideration can be given to suitability for publication in *Field Mycology* and any necessary arrangements for scientific review.

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Volume 26 (2) July 2025

CONTENTS

Book Reviews

Front cover: A fine *Neoboletus* specimen observed growing with *Quercus* (oak) in June 2025, South Lancashire (vc59), exhibiting the field characters of *Neoboletus praestigiator*, as illustrated in the new European Boletes book reviewed on page 72. Photograph © Mike Roberts, northwalesmushrooms.

Back cover: *Sporophagomyces chrysostomus* on the underside of *Ganoderma adspersum*. For a description of this species see Brian Spooner's article (page 60). Photograph © Hannah Chilvers.

EDITORIAL

Things are a little different around here

In the previous issue of this publication, I introduced myself as 'your new interim editor'. If producing issue 26(1) was a test, I am relieved to inform you I must have passed, because the British Mycological Society (BMS) has invited me to continue as editor on an ongoing basis. I am very happy about this, as I can see the submissions pipeline is filling up with lots more interesting articles which I look forward to sharing.

You may have noticed that Field Mycology Volume 26 looks a little different to previous volumes. This is because we've switched to new layout software, Affinity Publisher 2, which has the advantage of being free-to-use for eligible non-profit and charitable organisations, such as the BMS (https://affinity.serif.com/en-gb/business/nonprofit/). I've made a few more tweaks to the template this issue, to better match Field Mycology's established style.

The new website (https://fieldmycology.org/) gives us some indication of the audience that Field Mycology is reaching: well over 1,000 views for issue 26(1) and over 300 downloads. It is hosted for us by Open Journal Systems (https://openjournalsystems.com/) and built using an open source system developed by the Public Knowledge Project, PKP (https://pkp.sfu.ca/). PKP's mission to make research a global public good, by promoting participation in sharing and enjoying knowledge, has been a great inspiration to me in setting up the new production and distribution arrangements.

As anyone who's used it will appreciate, the internet is like a vast sea of information, with its own shifting tides. Websites can come and websites can go. So I feel it's important to highlight another major new development: the BMS has joined Crossref (https://www.crossref.org/) so that we can register permanent links for all the issues and articles we publish, called Digital Object Identifiers, or DOIs. Crossref membership also places us under certain obligations to publish information *about* the articles we're sharing (called 'metadata'), to make it easier for people to find, search and explore the content that we're publishing. For example, Crossref members are expected to link references, so that readers can follow a link from the reference list to the document that is being referred to. If you notice changes such as this in future issues, this is why. By joining Crossref, the BMS has underlined its commitment to stewarding the content we publish in Field Mycology, and the associated metadata, for the long term.

Paper copies available by subscription

My colleagues in the BMS Office have endeavoured to spread the news far and wide that paper copies of Field Mycology are available by subscription, via the BMS website (https://www.britmycolsoc.org.uk/fm-journal). However, this is an area where we would like to enlist your help: if you know someone who might like to read a paper copy of Field Mycology, who isn't 'online', please let them know that subscriptions can also be arranged by contacting the BMS Office directly by post or telephone (you can find contact details under 'Journal Information', on the inside front cover).

Alongside relaunching Field Mycology on the new website, the BMS has also reinstated arrangements for depositing paper copies at the British Library. If you know of other institutions that would be interested in our publication, please draw their attention to the information for librarians on the website (https://fieldmycology.org/index.php/journal/information/librarians).

That's enough about the mechanics of Field Mycology. Back to talking about fungi next time! You'll be relieved to hear it's all mushrooms, smuts, cyphelloid fungi and strange spore-eating fungal organisms from here on in. Plus we've snuck in a book review about myxomycetes…

Clare Blencowe

Correction notice

The online version of Field Mycology Volume 26(1) contained an incorrect caption on the inside back cover, in the Book Reviews section, from 24/04/2025 to 11/05/2025; this was corrected before the printed copy went to press. If you downloaded the online version before 11/05/2025, you may wish to re-download it at https://doi.org/10.63482/g0rrmg96.

Fungal Portrait: 102

Stropharia hornemannii (Fr.) S. Lundell & Nannf.
Conifer Roundhead

Liz Holden[1]

Fig. 1. *Stropharia hornemannii* showing typical cap colours, growing in litter, Abernethy Forest, 9 October 2023. Photograph © Liz Holden.

Stropharia hornemannii (Conifer Roundhead) was specifically named by Fries (as *Agaricus hornemanni*) for Jens Wilken Hornemann, a Danish botanist (1770–1841). The genus name comes from the Greek for a belt (Rea, 1922), which seems appropriate given the presence of a ring or ring zone, often highlighted by the dark spores, in all species.

This fungus is widespread in the temperate and boreal forests of the Northern Hemisphere: Fries once described it as ‘ubiquitous in our (Scandinavian) coniferous forests’. It has also been recorded from subalpine birch but in the UK it is restricted to a handful of sites in the Caledonian pine forests of the Central Highlands of Scotland. Indeed it is listed as CR (critically endangered) on the Scottish Biodiversity List (NatureScot, 2020), occurring in less than six 10 km squares.

It is considered a saprotroph and is usually found on the forest floor growing amongst the ground flora and pine litter (Fig. 1). The recent collections described below were in litter but the species is also said to occur on well decayed timber.

A member of the *Strophariaceae*, this has quite a robust fruiting structure, with a cap that can reach up to 20 cm—not something easily overlooked! The cap is viscid when wet and can vary in colour between brownish with a violet tint to something much paler (Fig. 2). The fruit body has a fragile ring (slightly striate above), often white veil remnants on the cap edge and, when fresh, with distinct white floccules below the ring zone (Fig. 3). The gills are adnate to sinuate and start out quite pale, quickly darkening as the spores mature. As would be expected for a species in the *Strophariaceae*, the spore print is dark violet or black with spores ellipsoid to amygdaloid and 10–13 x 5–7 µm. The cheilocystidia are cylindrical to clavate or lageniform and the pleurochrysocystidia lageniform or clavate with a mucronate apex; these are both illustrated on page 969 of Knudsen & Vesterholt (2018).

Peter Orton, a regular visitor to Abernethy Forest, first recorded it there in 1983 and again in 1992. These locations were then extensively searched in 2011 and 2012 by Nev Kilkenny and Andy Taylor for a Priority Species Surveillance

Fig. 2. *Stropharia hornemannii*: a young fruiting body showing pale colours of cap and gills. Photograph © Liz Holden.

Fig. 3. *Stropharia hornemannii* with floccules on the stipe, particularly obvious below the fragile ring. Photograph © Liz Holden.

project (Anon, 2014) but to no avail. The species was then recorded in 2022 by Stewart Taylor at a different location close by.

Despite being well aware of its existence, this species had previously eluded the author despite extensive foraying in these forests. So in 2023, when looking under old growth pine and finding a rather decayed collection with a lovely shaggy stipe and dark spores, bells were definitely ringing. A few hundred yards on a small group of these fungi were found, in tip top condition, and later work with the microscope and keys confirmed the identification. The following day, a further single fruit body was found, in another part of the forest; all different locations to the earlier collections. Going over the same ground a year later drew a blank. With such a small number of records it is difficult to make confident statements about its fruiting pattern but it does perhaps suggest that it might be more abundant below ground within the habitat, just requiring particular conditions to stimulate fruiting. Undoubtedly a genuinely rare fruiter in the UK.

Within the pinewood habitat, it would be difficult to mistake this species for anything else. Apart from habitat, the large spores distinguish it from *S. inuncta* and *S. coronilla* and the shaggy scales on the stipe from *S. halophila*, *S. rugosoannulata* and *S. melanosperma*. Two of the larger *Psathyrella* species known to the author do occur on conifer wood (*P. cotonea* and *P. caput-medusae*) but both have rather scaly caps. The range of colour for the cap of *S. hornemannii* is mentioned above and the illustrations in Læssøe & Petersen (2019) and Phillips (2006), both show collections with a much redder hue and a less shaggy stipe than the Abernethy collections.

Finding *Stropharia hornemannii* is a classic example of the unpredictability of fungal fruiting structures – years of frustrating search followed by a 'jump up and down' moment when something rare turns up!

Acknowledgements

Thanks to Neville Kilkenny for finding several of the specimens discussed in this article.

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Ovary smuts in seed capsules of British chickweeds

A. Martyn Ainsworth[1], Ben Blades[1], Alexandra Dombrowski[1, 2],
Kare Liimatainen[1], Laura M. Suz[1] & Roseina Woods[1]

Fig. 1. Smut-free examples of chickweed species known to host ovary smuts in Britain: (left) *Cerastium diffusum* (E. Sussex, Normans' Bay, coastal shingle, May 2024) and (right) *Moenchia erecta* (W. Sussex, Watersfield, short turf, May 2018). Photographs © A. Martyn Ainsworth.

Introducing the hosts: *Cerastium* and *Moenchia* (*Caryophyllaceae*)

White-flowered and weedy, the British members of *Cerastium* and *Moenchia* are small and inconspicuous plants which can look very similar (Fig. 1). They are classified in the family *Caryophyllaceae* alongside the more familiar and colourful campions, catchflies and pinks. Collectively, they are known as chickweeds and mouse-ear chickweeds, the latter often shortened to mouse-ears, and several are widespread and very common annual plants. They usually start flowering in early spring and have swollen seed capsules by May (Fig. 2). The developing seeds require a plentiful supply of nutrients which are funnelled from elsewhere in the plant. This presents an opportunity for ovary-infecting smuts to redirect those nutrients into the production of dense masses of dark purplish-brown smut spores within capsules that remain seedless. The development of infected capsules appears quite normal on the outside, thus concealing the internal diversion of resources into teliospore production. Infected capsules are, however, more detectable when they are fully mature and open at the apex. Peering through a hand lens into the toothed apical openings of infected mature capsules, it should be possible to distinguish the mass of dark brown spores that lies within from the naturally shadowy interior of a healthy seed-bearing capsule. That's the theory, but where have such smutty chickweed capsules been found in Britain?

First British collection of a *Cerastium* ovary smut and its taxonomic placement

After searching among the dried specimens preserved in the British fungal collections at RBG Kew, Spooner & Legon (2006) reported finding a single collection (K-M000106945) of smut-infected *Cerastium* capsules made in May 1902 by F.J. Chittenden. The host was *Cerastium glomeratum* Sticky Mouse-ear which had been found in Rainsford End, Chelmsford (vc19 North Essex), probably in OS grid square TL6807 or TL6907. Knowing that this annual plant was common throughout the country, Spooner & Legon (2006) noted that its capsule smut was "evidently very rare or perhaps overlooked in Britain". Another four years without any further discoveries prompted Natural England, the government's adviser for the natural environment, to accept that, after 108 years without any records at all, it was safe to assume that this smut fungus was extinct in England (Anon., 2010). Before moving on to the more recent finds of this species, we should mention the four names under which the Essex specimen has appeared in print and why.

As noted in Spooner & Legon (2006), the collection had originally been filed at Kew, along with many other specimens of diseased di- and monocotyledonous host plants, under the name *Ustilago violacea*. However, in recognition of accumulating evidence that this name had been applied to numerous distinct and host restricted species, some of whose earlier names were being retrieved from synonymy, it entered the British & Irish checklist as *U. duriaeana* (CBIB; Legon & Henrici, 2005). This name, which was accepted in Vánky's (1994) monograph of European smut fungi, was introduced for a species originally found inside *C. glomeratum* capsules in N. Africa (Tulasne & Tulasne 1847). The CBIB authors retained *U. duriaeana* as a true smut under the heading "Ustilaginomycetes" (subphylum Ustilaginomycotina). In stark contrast, *U. violacea* s.str., along with several other anther-infecting smuts segregated from it, were moved to *Microbotryum* to join the rust fungi under the heading "Urediniomycetes" (subphylum Pucciniomycotina). This reflected a major DNA-supported realisation that morphologically recognisable smuts were the products of convergent evolution. Some species within their ranks were outwardly concealing a very rusty ancestry! One year after the checklist was printed, however, Spooner & Legon (2006) stopped using the name *U. duriaeana* and switched to *Microbotryum duriaeanum*, recognising that this was yet another smut that should be classified in the rust subphylum. Later that same year, the Essex specimen appeared under a fourth name in the first CBIB update (Anon., 2006). Swiftly following the erection of the genus *Haradaea* by Denchev (Denchev *et al*., 2006), *H. duriaeana*, the generic type, was adopted as the checklist's new accepted name for the Essex specimen. This change was duly reflected in the recuration of the collection within the Kew fungarium and, furthermore, the name *H. duriaeana* was taken up by the BMS for the smut whose newly minted English name was Chickweed Seedsmut (BMS, 2024). However, this most recent taxonomic move deserves further scrutiny.

Denchev *et al*. (2006) erected *Haradaea* to accommodate the seed-destroying smuts on *Caryophyllaceae* based, at least in part, on the phylogenetic tree published in Almaraz *et al*. (2002). However, this ecological group of fungi was only represented by two sequences in Almaraz *et al*.'s tree: one was derived from *Arenaria* capsules and the other from *Cerastium*. Although this pair clustered together in the tree, they occupied an outlying position. Cautioning that this placement indicated that the *Cerastium* ovary smut's taxonomic relationships were "still uncertain", Almaraz *et al*. left the species within *Ustilago*. It was not long before Denchev (2006), followed by Lutz *et al*. (2008), acknowledged that Almaraz *et*

Fig. 2. Seeds squashed from mature capsules of (left) *Cerastium diffusum* (E. Sussex, Normans' Bay, May 2024) and (right) *Moenchia erecta* (E. Sussex, Rye Harbour, May 2015). Photographs © A. Martyn Ainsworth.

al. had sequenced fungal contaminants instead of the target ovary smuts. Nevertheless, further species were recombined in *Haradaea*, albeit on increasingly shaky grounds. As more published sequences accumulated, however, a taxonomic choice had to be made: to retain *Haradaea* for a monophyletic group of ovary smuts on *Caryophyllaceae*, which would necessitate the splitting of *Microbotryum* into many new and relatively small genera (complicated option), or, to add *Haradaea* to the synonymy of a monophyletic *Microbotryum* (simpler option). As a result, MycoBank, Species Fungorum, Vánky (2012), Kemler *et al*. (2020) and Denchev *et al*. (2023) all opted to synonymise *Haradaea* with a broadly circumscribed anther- and ovary-infecting *Microbotryum*. For now, at least, *Haradaea* has been abandoned, even by its own author. This decision is now reflected in CBIB Update 13, which includes an entry for *Microbotryum duriaeanum*, thus marking a reversion to the taxonomy adopted in Spooner & Legon (2006).

Subsequent British collections on *Cerastium*

Microbotryum duriaeanum was recorded on *Cerastium glomeratum* as a new addition to the Welsh funga in 2013 (as *Haradaea*, in Woods *et al*., 2018) and was refound in England, after a gap of 117 years, in 2019. It is now known from three sites in England and two in Wales and the list of host plants now extends to: *C. diffusum* Sea Mouse-ear, *C. glomeratum* and *C. semidecandrum* Little Mouse-ear. Thus far, AMA's own searches have been restricted to Sussex (where he lives) where coastal sites were deliberately targeted in the hope of finding several *Cerastium* species growing in close proximity. The searches involved peering into a seemingly endless supply of chickweed capsules for signs of smut over a period of a few hours at each site visited, only to be rewarded with, if anything, just one tiny patch of infected host plants per visit. This smut will certainly have been overlooked in the past, due to a lack of deliberate searching, nevertheless it still seems to be rather uncommon, at least along the East Sussex coast. AMA found no infected plants of *C. glomeratum*, but did find some very small patches of infected *C. diffusum* and *C. semidecandrum* among some large populations of uninfected plants. Interestingly, although all sites visited had at least three *Cerastium* species present, no more than one of these was found to be infected at each site. It is generally accepted that these infections are systemic (e.g. Vánky, 2012) and this was borne out by AMA's failure to find any healthy seed-bearing capsules on infected plants. This is clearly bad news for the individual host plants, but it is invaluable knowledge for the field mycologist trying to select good material for DNA sequencing. Having found an infected plant, one should try to sample some of its immature capsules as these will still be densely packed with smut spores on arrival back at the lab. Capsules that are collected when mature, open and releasing spores, on the other hand, are quite likely to lose most of their dusty contents in transit.

All the known post-1902 British collections are listed below:

England. East Sussex (vc14): Normans' Bay, on *C. diffusum* on consolidated coastal shingle, TQ694059, 14 May 2024, coll. A.M. Ainsworth (K-M001442720, GenBank PV124721, Fig. 3). Rye Harbour, southeast of Camber Castle, on *C. semidecandrum* in parched turf overlying shingle ridges, TQ92311831, 21 Apr. 2019, coll. A.M. Ainsworth (K-M000263027, GenBank PV124720, Fig. 3). *Ibid*, north of Camber Castle, on same host and in same habitat as in 2019, TQ921188, 27 May 2024, coll. A.M. Ainsworth (K-M001442722). Tide Mills, on *C. diffusum* on consolidated coastal shingle, TQ459001, 20 May 2024, coll. A.M. Ainsworth (K-M001442721). **Wales**. All on *C. glomeratum*. **Cardiganshire** (vc46): Llanrhystud, in poached coastal grassland between clumps of *Ulex*, SN534702, 11 Jun. 2016, coll. A.O. Chater (K-M000205685, GenBank PV124719) and seen here again in May 2018 (host erroneously listed as *C. diffusum* in Woods *et al*., 2024). **Montgomeryshire** (vc47): Ffridd Faldwyn, by hedge under grazed *Ulex*, SO21609671, 2 Jun. 2013, coll. A. Jones (K-M000263026, GenBank PV124718).

British collections on *Moenchia erecta*

In contrast to the situation in *Cerastium*, there is only one British species of *Moenchia*: the uncommon spring-flowering annual, *M. erecta* Upright Chickweed. The printed checklist entry for *Ustilago duriaeana* includes Wales in its distribution details (Legon & Henrici, 2005). This is presumably a reference to the two Welsh collections on *Moenchia* found in 1997 and 1998 at Ffridd Faldwyn in Montgomeryshire (see below) which are now preserved at Kew. The checklist authors thought these two smut collections were "possibly" conspecific with the Essex specimen on *Cerastium*. This possibility was explored further in Spooner & Legon (2006), who concluded that *Moenchia* might represent a new host for

Fig. 3. *Microbotryum duriaeanum* spores squashed from capsules of (upper left) *Cerastium diffusum* (K-M001442720, E. Sussex, May 2024) and (below) *C. semidecandrum* (K-M000263027, E. Sussex, Apr. 2019) and spores of *M. moenchiae-manticae* in capsules of (upper right) *Moenchia erecta* (K-M000197779, E. Sussex, May 2015). Photographs © A. Martyn Ainsworth.

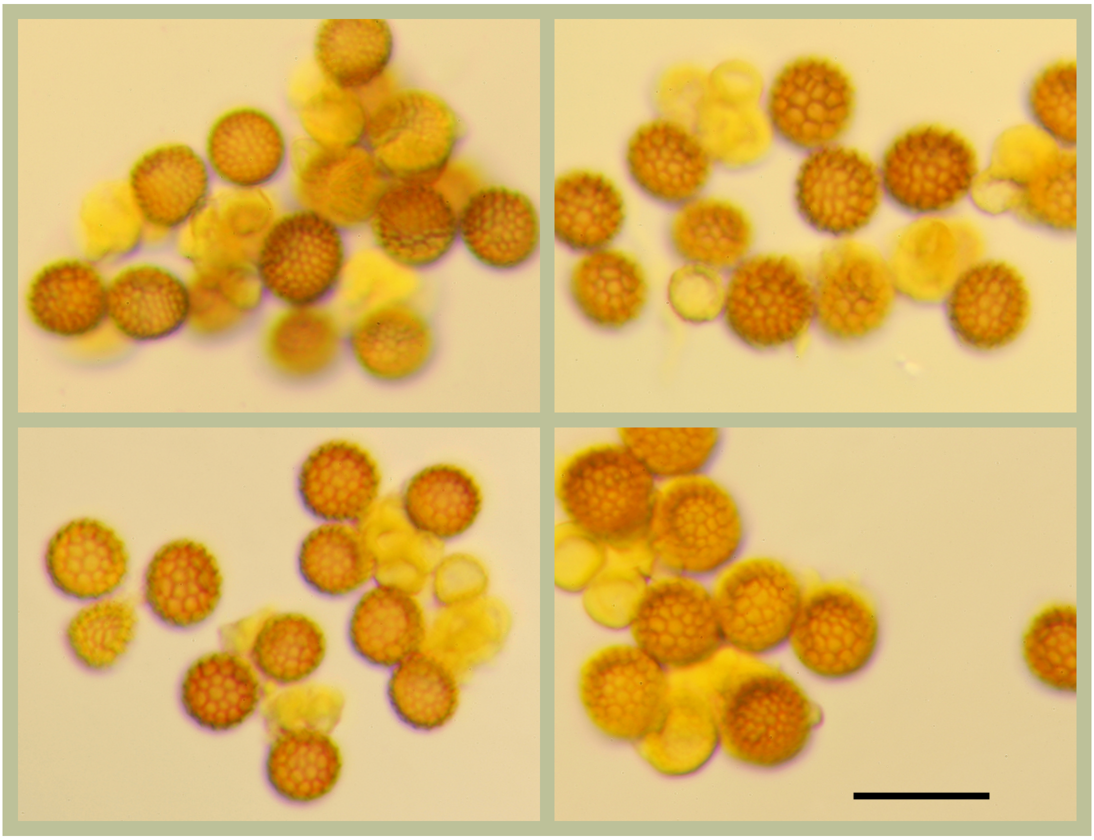

Fig. 4. Teliospores of *Microbotryum* species from infected chickweed ovaries in Melzer's reagent showing reticulate ornamentation. One micrograph shows *M. moenchiae-manticae* spores (can you spot it?) and the others show those of *M. duriaeanum* (answer in the text). Scale bar (for all four) represents 20 µm. Micrographs © A. Martyn Ainsworth.

Microbotryum duriaeanum since the only known ovary smut on *Moenchia*, namely *Microbotryum moenchiae-manticae*, recorded on the non-British *Moenchia mantica*, had larger spores than they had seen in the Welsh material. On the contrary, after visiting Kew in 2010 to examine the morphology of the material collected in Wales in 1998, Denchev *et al.* (2011) concluded that its spores did indeed match those of the distinct species *Haradaea moenchiae-manticae*, a species which would be new to Britain. Their opinion was followed in the fifth CBIB update and *H. moenchiae-manticae* was duly added to the British and Irish list (Anon., 2011). Woods *et al.* (2018) drew attention to the remarkable coincidence of *Cerastium* and *Moenchia* ovary smuts, described as "two extremely rare fungi", being found at the same site (Ffridd Faldwyn) "so close together". This prompted them to resurrect the taxonomic uncertainties that had been expressed earlier by Spooner & Legon (2006) and they concluded that further work was required as the two smuts "may prove to be conspecific" and "a result is still awaited". Interestingly, this curious coincidence was repeated during the current study when infected ovaries of *Cerastium* and *Moenchia* were recorded (by AMA) at the same site (Rye Harbour) in southern England. Despite such improbable coincidences, the ovary smuts on these two genera continue to be recognised as distinct species in Britain and Ireland (Woods *et al.*, 2018), an opinion supported by DNA barcode evidence (see Fig. 5).

All the known British collections are listed below:

England. East Sussex (vc14): Rye Harbour, south of Camber Castle, on host in thin soil overlying consolidated shingle, TQ92231808, 4 May 2015, coll. A.M. Ainsworth (K-M000197779, GenBank PV124716, Fig. 3). **South Hampshire** (vc11): New Forest, Bull Hill, near car park, on host in tightly grazed dry grass heath, SZ34209796, 11 May 2015, coll. A. Lucas & A.M. Ainsworth (K-M000197978, GenBank PV124717). **Wales. Montgomeryshire** (vc47): Ffridd

Faldwyn, SO29, 2 Jun. 1997, coll. A. Jones (T.F. Preece 5617) (K-M000106050, specimen not found). *Ibid*, SO216968, 15 May 1998, coll. A. Jones (T.F. Preece 6356) (K-M000106303), ITS barcode MN657198 published in Kemler *et al.* (2020).

Morphological study

Teliospores of *Microbotryum duriaeanum* and *M. moenchiae-manticae* are globose to ovoid or short ellipsoid with reticulate ornamentation and they have similar size ranges (Fig. 4). Vánky (2012) gives measurements of 12–17 × 11–15 µm for the former and 12–15(–17) × 11–15.5 µm for the latter. He indicates that there might be a slight difference in the number of meshes per spore diameter: 4–7(–8) in the former and 6–9 in the latter, although the ranges show considerable overlap. Ten spores measured at × 1000 magnification (in Melzer's reagent and including ornament) from sequenced *M. duriaeanum* K-M000263026 (ex *C. glomeratum*, Montgomeryshire) were in the range 12.8–16 × 12.2–15 µm with 5–6 meshes per diameter. Corresponding values for sequenced *M. moenchiae-manticae* K-M000197978 (ex *M. erecta*, South Hampshire) were in the range 12.8–16 × 12.2–14.1 µm with 6–7 meshes per diameter. Examining spores from several collections did not increase confidence in the discriminatory power of these morphological characters. Looking at Fig. 4, for example, the smallest mesh size (largest number of meshes per diameter) is seen in the upper left micrograph which is of *M. duriaeanum* (K-M001442721 on *C. diffusum*). The other micrographs show *M. duriaeanum* (K-M000205685 on *C. glomeratum*) at upper right and (K-M001442722 on *C. semidecandrum*) at lower left. The lower right micrograph is the odd one out and shows spores from K-M000197978 on *M. erecta*. Clearly, the results of our morphological study were not very taxonomically helpful and prompted us to switch to a molecular barcode-based approach.

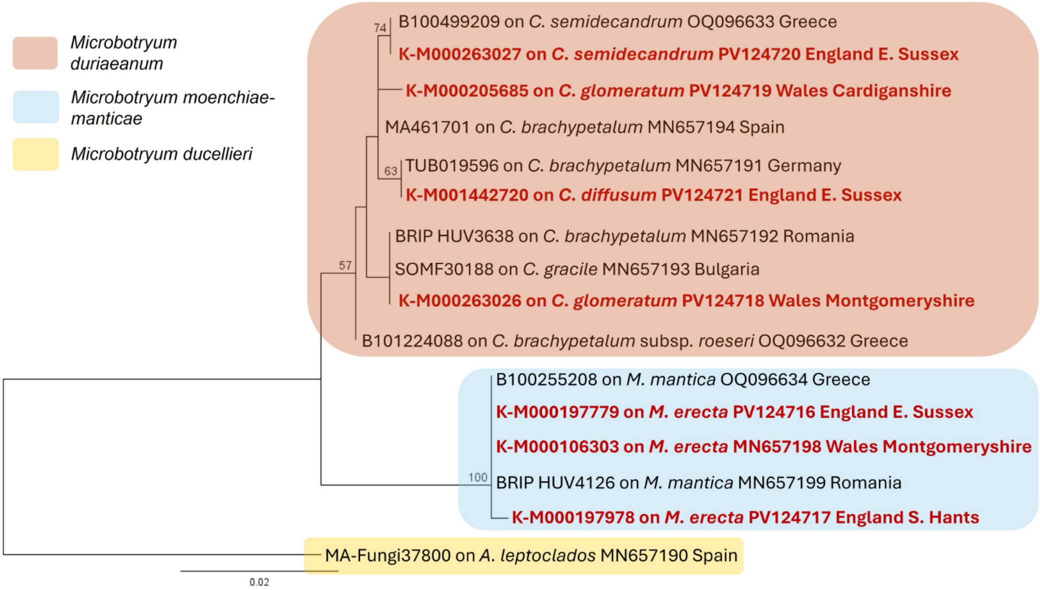

Fig. 5. Maximum likelihood phylogram showing ITS sequences of three *Microbotryum* species (shaded boxes) which infect ovaries of *Caryophyllaceae*. Sequences are labelled respectively with their fungarium accession number or collector's code, host plant name (*Arenaria*, *Cerastium* and *Moenchia*), GenBank accession number and geographic source. Sequences derived from British collections are shown in red. Nodes are labelled to indicate branch support (shown as a maximum likelihood bootstrap percentage) where this exceeds 50%. Scale bar indicates the number of substitutions per site.

DNA sequencing and analysis

We attempted to sequence the full nuclear ribosomal internal transcribed spacer regions (ITS) of eight of the British collections listed above using previously published protocols (Dentinger & Suz, 2014; Liimatainen & Ainsworth, 2018; Wainhouse *et al*., 2024). We obtained sequences from seven of these collections: two from infected *Moenchia erecta* and five from *Cerastium* spp., all of which were sourced from material preserved in Kew. A sequence (MN657198) derived from one of these specimens (K-M000106303) and matching ours was published in Kemler *et al*. (2020). This left us with six newly generated and unpublished ITS sequences which were deposited in GenBank (accession numbers PV124716–PV124721).

Our sequences were aligned using MUSCLE 5.1 and a maximum likelihood phylogram (Fig. 5) was generated using RAxML 7.2.8. with the nucleotide substitution model GTRGAMMA and branch support estimated with 1000 rapid bootstrap replicates in Geneious version 2024.0. The phylogram includes ten additional *Microbotryum* sequences downloaded from GenBank including MN657190, which was selected as the outgroup. This was generated from a specimen labelled as *Microbotryum ducellieri*, an ovary smut found on *Arenaria leptoclados* and one which has yet to be recorded in Britain or Ireland. Downloaded sequences whose codes begin with MN are from Kemler *et al*. (2020) and those beginning with OQ are from Denchev *et al*. (2023). The ITS sequences from ovary smuts of *Cerastium* and *Moenchia* collected in England and Wales formed two distinct clusters which corresponded with their host plant genus (Fig. 5). Although there are no publicly available sequences from type specimens of *Microbotryum duriaeanum* or *M. moenchiae-manticae*, all the British sequences clustered with existing sequences bearing one of these two labels. The *M. moenchiae-manticae* cluster is well supported (bootstrap support value 100) whereas the corresponding support for *M. duriaeanum* is lower (57). Future studies, including broader taxon sampling and sequencing of additional gene regions could increase support for these clusters. Based on the available molecular evidence therefore, British material found on *Cerastium* should continue to be determined as *M. duriaeanum* while that on *Moenchia* should continue to be assigned to *M. moenchiae-manticae*. Although they are rarely recorded and, based on our very limited field survey data, are quite possibly genuinely rare in Britain, our analysis confirmed that both species do coexist at some sites, e.g. in the Rye Harbour area in England and at Ffridd Faldwyn in Wales.

Conclusion

This study provides further evidence that *Microbotryum duriaeanum* and *M. moenchiae-manticae* are both extant in England and Wales and should dispel any residual doubts arising from the taxonomic concerns expressed in Spooner & Legon (2006) and Woods *et al*. (2018).

Acknowledgements

Thanks to A.O. Chater and A. Jones for depositing their chickweed ovary smut collections in RBG, Kew and making them available for our study. BB, AD, and RW gratefully acknowledge sequencing support from the Darwin Tree of Life project (https://www.darwintreeoflife.org/).

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Recent occurrence of *Ripartites metrodii* in Scotland:

DNA barcoding, phylogenetic reconstruction and implications for conservation

Vladimir Krivtsov[1,2,3] & David Harries[4]

Abstract

Ripartites metrodii, a saprotrophic basidiomycete, has seldom been recorded in Britain (two records currently available on the Global Biodiversity Information Facility (GBIF), both from England, and none on the NBN Atlas database). The 2005 Checklist of the British & Irish Basidiomycota (CBIB) recognised only a single *Ripartites* species, *R. tricholoma*, following a widely held view that this was a 'very polymorphic' species. *R. metrodii* was cited only as one of several synonyms variously recognised at species level elsewhere in Europe. The FRDBI database currently follows CBIB. There have been five previous Scottish collections reported as *R. tricholoma*, but none of these appear to correspond to *R. metrodii* as now understood.

Here we report on the recent occurrence of *R. metrodii* in a coniferous forest in the Scottish Highlands, present its barcoding sequence, and discuss the implications for conservation of this species. Morphological and molecular analyses, including DNA barcoding and phylogenetic reconstruction, confirmed the identity of the specimens. Our material fitted into a well supported cluster treated as *R. metrodii* in the UNITE database and distinctly separate from a cluster treated as *R. tricholoma*. This supports the view that they should be treated as two different species, albeit with the names provisionally assigned until such time as sequences are obtained for type material. The findings also underscore the importance of mature conifer plantations, traditionally considered low in

biodiversity, in supporting valuable fungal communities. These plantations, while often overlooked, contribute significantly to the conservation of ectomycorrhizal and saprotrophic fungi, highlighting the need for their inclusion in biodiversity management plans.

Introduction

Fungi are an important component of forest ecosystems; they are involved in complex multivariate interactions in soil and litter and are crucial for overall ecosystem functioning (Krivtsov *et al.*, 2004).

Ripartites metrodii is a saprotrophic basidiomycete rarely recorded in the UK. At the time of writing, there appear to be only two UK records (both from England) on the GBIF database (https://www.gbif.org/species/2531578). The NBN database contains no records for this species. The Checklist of the British & Irish Basidiomycota (Legon & Henrici, 2005) and the FRDBI database include this species, as well as *R. helomorphus*, within *R. tricholoma*. The FRDBI contains only five records of *R. tricholoma* in Scotland, none of them of *R. metrodii* as now understood. Furthermore, none were from the Scottish Highlands (the record of Dennis from 1974 is of *R. helomorphus* on Ness island).

Here we report on the recent occurrence of *R. metrodii* in the Scottish Highlands and discuss implications for conservation of this species.

Materials and Methods

Basidiomes of *R. metrodii* were observed on 6 September 2024 in Craigvinean Forest (grid reference NO007419). The site belongs to the Forestry Commission and is a mature coniferous plantation. The forest floor is covered by bryophytes and ericoid shrubs with occasional birch saplings.

Two basidiomes were sampled for subsequent microscopic examination and DNA barcoding. In the laboratory both basidiomes were examined using a dissecting microscope. Spore prints were obtained and the colour recorded. Standard preparations were then made using water,

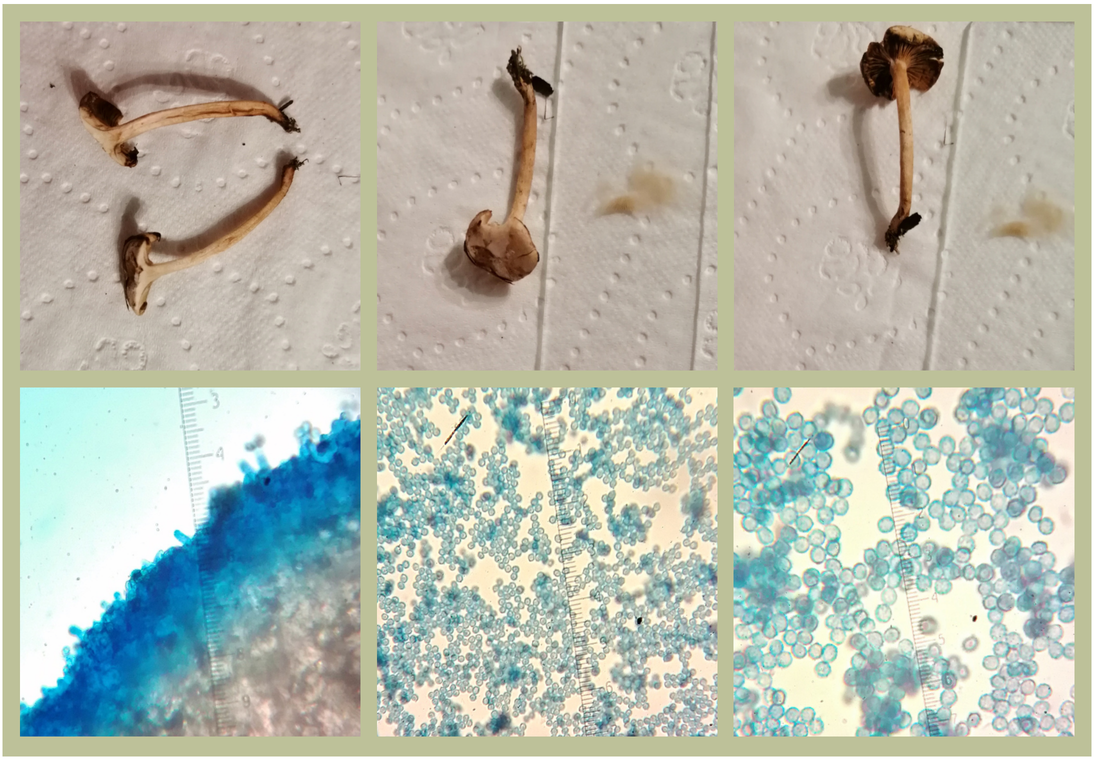

Fig. 1. Appearance and key microscopic characteristics of the *Ripartites metrodii* specimen from Craigvinean Forest. Upper panels: macro characters (specimen appearance, cross-section and spore print colour), a standard laboratory slide is provided for the scale. Note the absence of hairs on the cap margin.
Lower panels: micro characters - gill edge showing basidia and the absence of cheilocystidia (left), spores (measuring 4–5 µm) under magnification 400× (middle), and spores under magnification 1000× (right).
Images © Vladimir Krivtsov.

Melzers and cotton blue reagents, and subsequently examined using a high-power compound microscope. The appearance and key characters of the sampled material are shown in Figure 1.

One of the specimens was submitted to the IBERS Genomics Facility at Aberystwyth University for DNA amplification and Sanger sequencing of the ITS barcode region. The sequence for our collection (GenBank accession number PQ724458) was compared with sequences held in the UNITE database (Abarenkov *et al.*, 2024) to determine the best match Species Hypothesis (see below). A maximum likelihood phylogenetic tree (Figure 2) was inferred using these sequences to examine the placement of our collection and visualise its relationships with closely related taxa. A sequence for *Paralepista flaccida* was incorporated as an outgroup.

Results and Discussion

The nucleotide sequence obtained from our Scottish collection was identical to corresponding sequences labelled as *R. metrodii* on GenBank. Both the macro- and micro-characters of sampled specimens (Figure 1) showed a good fit to the descriptions of *R. metrodii* available in the literature. The ornamented non-amyloid sub-globose spores measured approximately 4–5 µm and revealed a moderate response to cotton blue. Although this cyanophilous reaction is not unknown (see Vizzini *et al.*, 2024 and references therein), we found no mention of it in the majority of the consulted entries (Breitenbach & Kränzlin, 1991; Bon, 2007; Læssøe & Petersen, 2019). This should be borne in mind whilst identifying this

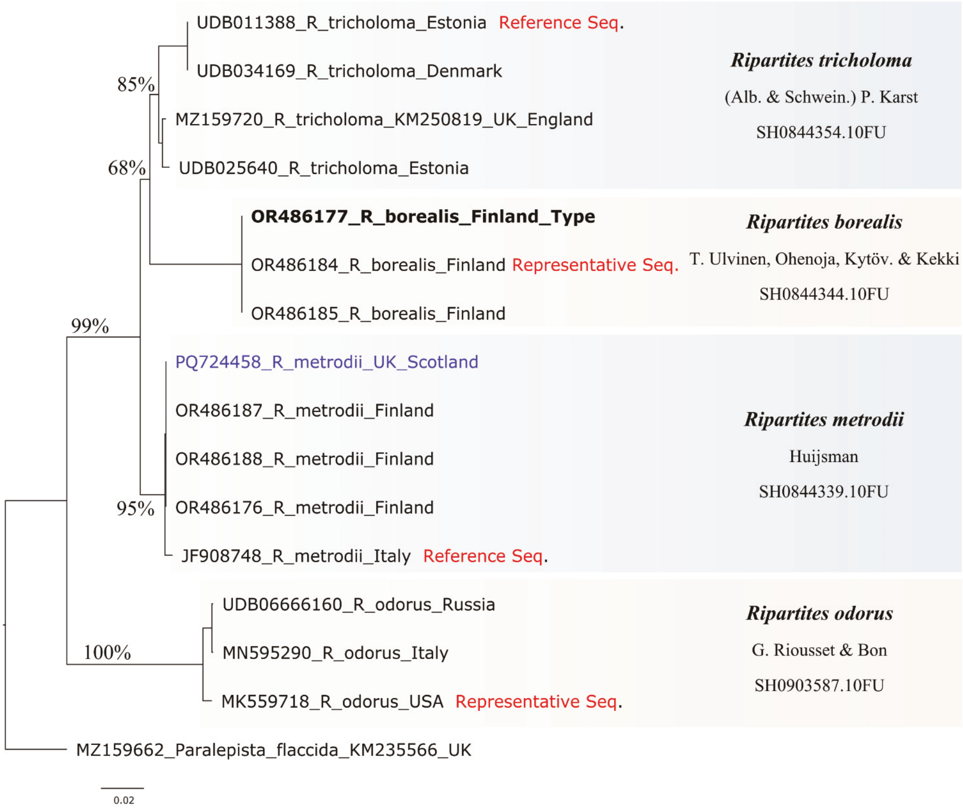

Fig. 2. Phylogenetic tree of selected *Ripartites* species. Bootstrap values (shown next to key horizontal branches) provide an assessment of confidence for each clade, with values of 70% or more often regarded as good support. They are calculated by repeating the process of generating a phylogenetic tree on a resampled set of data and counting how many times a branch is observed. The horizontal branch length indicates the amount of genetic change over time. The scale bar at the bottom of the figure shows the length of branch that represents a genetic change of 0.02 where the units are the number of nucleotide changes divided by the length of the sequence. The *Ripartites* species included in the tree are those for which genetic sequences were available in the UNITE database at the time of writing.

fungus, as confusion with *Lepista* (which also has ornamented cyanophilous spores) needs to be avoided. Pegler and Young (1974) provide a comprehensive treatment of *Ripartites* and *Lepista* spore shapes using scanning electron microscopy; however, the cyanophilous reaction of *Ripartites* spores does not appear to be mentioned there explicitly either.

Recent molecular studies (Vizzini *et al.*, 2024) place *Ripartites* into the *Paralepistaceae* family within the *Tricholomatineae* suborder of the order *Agaricales*. Species concepts within *Ripartites* vary significantly between authorities with the number of recognised European species ranging from seven in the GBIF database and five or possibly six in Fungi of Temperate Europe (Læssøe & Petersen, 2019) down to three in Flora Agaricina Neerlandica 3 (Bas *et al.*, 1995) with just one, *R. tricholoma*, currently listed in the Checklist of the British & Irish Basidiomycota (Legon & Henrici 2005). Apart from GBIF, none of the above recognise *R. metrodii* as a separate species. The same is true of Funga Nordica (Knudsen & Vesterholt, 2012). However, this species is recognised by Moser (1983), Courtecuisse and Duhem (1995) and Bon (2007). It should also be noted that Buczacki and Wilkinson (1989) list *R. metrodii* as a European species, but note its rarity and question whether it actually occurs in Britain. However, an earlier article of Pegler and Young (1974) recognised both *R. tricholoma* and *R. metrodii* as two separate species occurring in the British Isles and provided a key for their identification. In general, therefore, there is no consensus among authorities on this matter.

The UNITE database (https://unite.ut.ee accessed January 2025) is a publicly accessible resource within which fungus DNA sequences (ITS region) are curated and stored. Sequences are clustered into groups approximating to species level with each group assigned a unique identifying label called a Species Hypothesis (SH). Within each group a sequence is selected by the computer program to provide a Representative Sequence for the corresponding SH. In cases where expert knowledge on a particular taxon is available these choices are designated as Reference Sequences.

Named ITS sequences have been published for four genetically distinct *Ripartites* species and include UNITE reference sequences for the two of particular relevance to this paper: *R. tricholoma* and *R. metrodii*. There is no record of an ex-type collection sequence for either species but a sequence derived from the holotype is reported for the recently described *R. borealis* (Kekki, 2023).

A maximum likelihood phylogenetic tree (Figure 2) was derived from selected *Ripartites* sequences held in the UNITE and GenBank databases with the inclusion of our collection from Scotland together with a sequence for *Paralepista flaccida* as an outgroup. The collection from Scotland clearly falls within the *R. metrodii* clade based on sequences from Finland and Italy. This is *R. metrodii* sensu Kekki (e.g. OR486187) and Osmundson *et al.* (2013) (JF908748) which, in the current absence of an ex-type sequence, seems to be the best available candidate to represent *R. metrodii* in the original sense, at least for now.

Bon (2007) states that *R. metrodii* is rare in Britain. That may, however, be linked to the fact that its identification is not straightforward and that the species is missing from popular field guides (e.g. Phillips 1981). Furthermore, fungal fruiting is subject to a multitude of complex interactions, and some species persist without fruiting for many years (Krivtsov *et al.*, 2003).

It should also be noted that some of the prominent books treat *R. metrodii* as part of *R. tricholoma* (e.g. Knudsen & Vesterholt, 2012). However, the phylogenetic reconstruction presented here, places *R. tricholoma* and *R. metrodii* in separate clades, indicating that separation of these species on a molecular basis is significant (Figure 2).

Further studies should focus on the characterisation of *R. metrodii* population(s) and its/their interactions with other members of the biological community (*sensu* Krivtsov *et al.* 2004, 2006).

Coniferous plantations are generally regarded as of poor biodiversity value, but there is evidence that plantation forests can provide valuable habitats and contribute significantly to biodiversity conservation (Brockerhoff *et al.*, 2008). In particular, studies in Britain have shown that mature coniferous plantations can have high species richness of ectomycorrhizal and saprotrophic fungi and are therefore important for their conservation (Humphrey *et al.*, 2000).

The occurrence of *R. metrodii* within this mature plantation is important for its conservation. This should be taken into account whilst designing land use plans and environmental management actions. A recent discovery of *Chamonixia caespitosa* in a spruce plantation in Wales (which was subsequently felled) emphasised the difficulties related to conservation of rare fungi associated with non-native trees (Hobart, 2024). Our study contributes further evidence for the conservation potential of coniferous plantations, which should be carefully examined on a case-by-case basis and weighed against any commercial benefits.

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Cyphella ferruginea P. Crouan & H. Crouan

An interesting and overlooked cyphelloid fungus

Peter R. Smith[1]

Fig. 1. *Cyphella ferruginea*. A = Gloucestershire, B = Sussex. Photographs © Peter R. Smith.

The cyphelloid fungi are a morphological group in the *Agaricales* with much in common but without clearly defined boundaries. They all form cup-shaped sporophores, at least initially, but in many species these may elongate to become bell- or tube-shaped, or widen to become bowl- or plate-shaped, and in some cases flabelliform. They have evolved independently in at least thirteen different families, mostly from gilled ancestors, where they have lost their gills or have seen them reduced to just a few low ridges. Cyphelloid fungi have been woefully neglected in many of the major works on the *Agaricales*. They are reasonably well represented in Funga Nordica (FN) with keys to 32 species, and more recently with excellent photographs of 38 species in The Fungi of Temperate Europe (FTE), with keys to 67 species to follow in volume 3. However, *Cyphella ferruginea* is absent from FN as it was not recorded in the Nordic countries at the time of publication, and only gets a very brief mention in FTE. In fact, the number of descriptions of this taxon in all the main books on European fungi is zero. The 1867 type description from the extreme

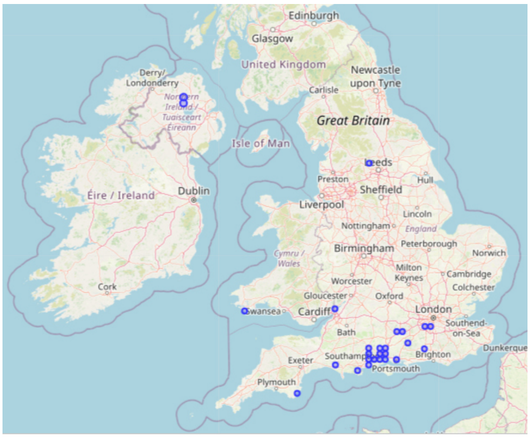

Fig. 2. British distribution of *Cyphella ferruginea* on the Fungal Records Database of Britain and Ireland (British Mycological Society, 2009).

Atlantic coastal area of France is totally inadequate by modern standards. To date, the only other description is in a Dutch paper by Dam & Dam (2012).

Britain appears to be the stronghold for *Cyphella ferruginea* with 33 records on the FRDBI database, dating back to 1980. The British distribution is mainly south-west (see Fig. 2). However, there is one record from Otley in Yorkshire and two from Northern Ireland. Further collections held in the Kew fungarium and cited in the Basidiomycete Checklist (Legon & Henrici 2005) range from the Isle of Skye to the Channel Islands, so it might be expected to turn up anywhere in the UK if searched for. The records suggest the best time to find this species is from late autumn to early winter. The 'Global Biodiversity Information Facility' database (GBIF), accessed in January 2025, also has (excluding duplicates and records that relate only to fungarium locations) single records from Denmark and Portugal, and another single record from Taiwan in 2023. This outlier record is from a very different climate and unfortunately has no supporting microscopy or DNA evidence, however, it is accompanied by some convincing images. In the Netherlands, Dam & Dam (2012) report a collection of this species. After an initial struggle to identify it due to the shortage of literature, they

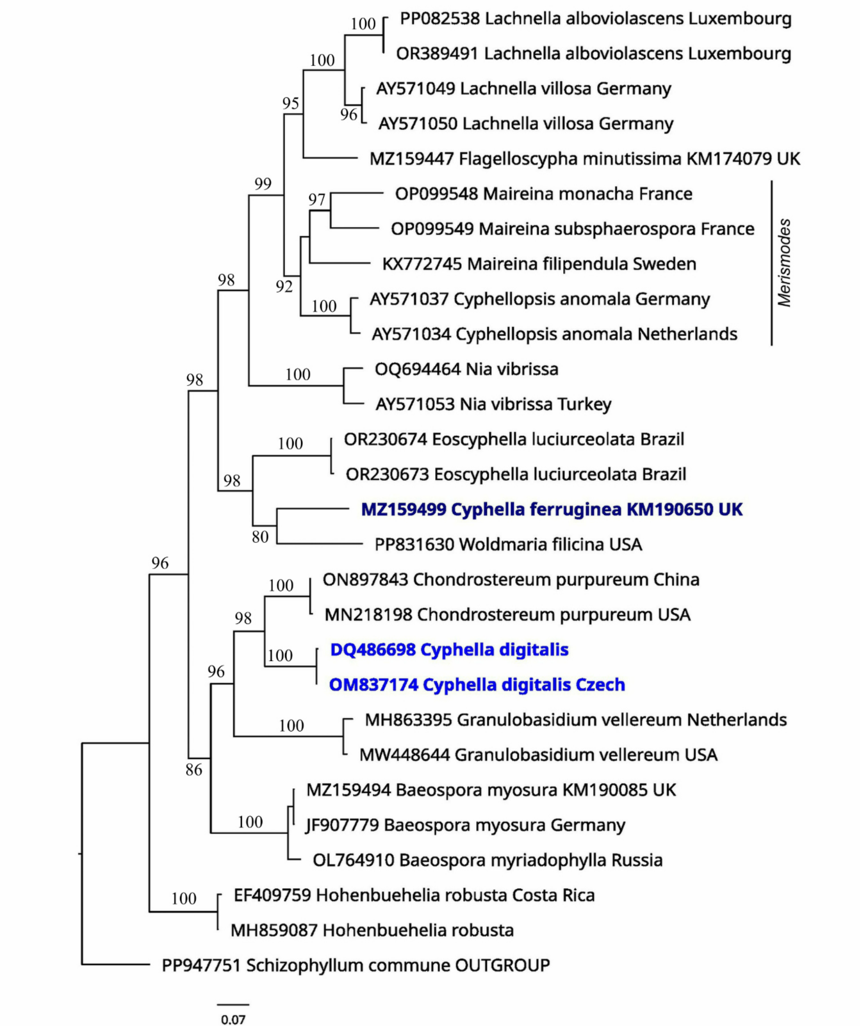

Fig 3. A Maximum Likelihood tree inferred from sequences of the ITS and 5.8S regions with bootstrap values >70% indicated above or near branches, courtesy of David Harries.

Fig. 4. A look-a-like: the ascomycete, *Perrotia flammea*. Photograph © Peter R Smith.

specifically searched for more in a second geographical area, where it was found at another four locations. However, these Dutch records have not yet made it into GBIF.

Although *Cyphella ferruginea* was described in the genus *Cyphella*, it is now clear that it is not related to the type species *C. digitata* and does not belong in this genus. There is only one ITS sequence in Genbank (MZ159499), from a voucher specimen held at Kew. This was collected in East Suffolk, identified by Alick Henrici, and sequenced by staff at Kew. When I subjected this sequence to a 'Blast search' of GenBank records, the nearest match (ITS 79.9% @ 100% cover) was *Eoscyphella luciurceolata*, a recently discovered bioluminescent cyphelloid taxon from Brazil. This has almost identical spirally twisted hairs and similar subglobose spores. Silva-Filho *et al.* (2023) place this taxon at the base of the *Cyphellopsidaceae* close to *Woldmaria*. Fig. 3 is a phylogenetic tree constructed from various ITS sequences from GenBank, which although not as phylogenetically accurate as a tree derived from LSU sequences, it does give a probable insight into the relationships of both *Cyphella ferruginea* and *C. digitalis* to other closely related species, and also demonstrates their separation. It can be seen that *Cyphella ferruginea* will need to be moved out of the *Cyphellaceae* and become the type of its own new genus.

Unlike other known cyphelloid fungi, *Cyphella ferruginea* is found directly on the bark of living trees, especially *Quercus* and *Salix*, but it is also known from *Corylus*, *Malus*, *Fraxinus* and *Acer campestre*. Morphologically it can be mistaken for the uncommon orange-red discomycete *Perrotia flammea* (see Fig. 4) that is usually found on dead branches.

I have yet to find *Cyphella ferruginea* myself but I have been sent fresh material from Gloucestershire, East Sussex and London. Interestingly, the spores from the Gloucestershire collection are slightly more dacryoid (see Fig.5). The basidiocarp colour can also vary between bright ochre and a bright reddish orange.

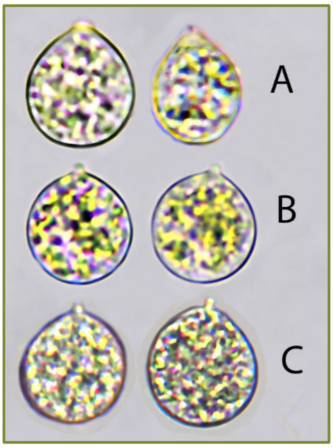

Fig. 5. *Cyphella ferruginea* spores.
A = Gloucestershire;
B = London;
C= Sussex.
Micrographs © Peter R. Smith.

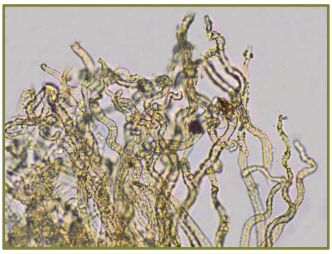

Fig. 6. *Cyphella ferruginea* hairs. Micrograph © Peter R. Smith.

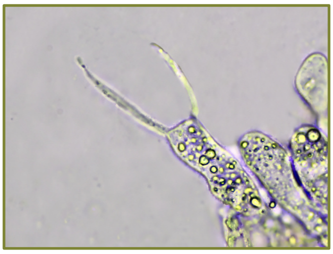

Fig. 7. *Cyphella ferruginea* basidium. Micrograph © Peter R. Smith.

Description

Basionym: *Cyphella ferruginea* P. Crouan & H. Crouan

Synonym: *Solenia ferruginea* (P. Crouan & H. Crouan) Quél.

Etymology: Latin *ferrugo* = iron rust, referring to the rusty brown colour of the basidiocarps.

Basidiocarp: cup-shaped to cone-shaped, 0.5–2 mm diameter, up to 4 mm long. Sessile and centrally attached. Outside covered with long straggly orange-brown or reddish-brown (ferruginous) hairs. **Hairs**: often in a tangled mass, the end sections frequently spirally twisted (Fig. 6) up to 150 µm long and 3–5 µm wide, with rounded tips, +/- covered with fine granules, appearing brown under the microscope. **Trama hyphae**: sparsely septate with clamped septa towards the base. **Hymenium**: creamy white. The margin is often curved inwards and the cups are reluctant to open, often just leaving a small aperture in the centre. **Basidia**: large up to 50 µm long with clamps, mostly four-spored, but occasionally two-spored (Fig. 7), with very long, curved sterigmata up 30 µm long. **Spores**: subglobose to dacryoid, (9.5–) 10–14 (–15) x 10–13.5 µm excluding the apiculus, Q = 1–1.2. Usually containing one oil drop, but may contain many smaller drops. **Substrate**: attached in scattered groups on the bark of living deciduous trees especially *Quercus* and *Salix*, often along with mosses and other lignicolous fungal species.

Acknowledgements

Thanks to Alick Henrici and David Harries for their help in the preparation of this article.

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A case of mistaken identity

Cortinarius simulatus and *C. brunneotinctus*

Geoffrey Kibby[1] & Mario Tortelli[2]

Fig. 1. The original collection in 2019 of *C. simulatus* from Fairy Hill, Boat-of-Garten, Scotland. Photograph © Mario Tortelli.

In 2019 one of us (MT) made a collection of an attractive *Cortinarius* from a mixed birch and pine woodland on a hillside popularly known as Fairy Hill, in Boat-of-Garten, in the Caingorms National Park, Scotland (Fig. 1). With its quite large size, 5–7 cm across, beautiful violet stem and purple-brown to greyish purple or red-brown cap it seemed very distinctive. At that time however our *Cortinarius* literature was much more limited than it is today, consisting mainly of the *Cortinarius Flora Photographica* (Brandrud *et al.*, 1989–2018) and *Funga Nordica* (Knudsen & Vesterholt, Eds. 2012). Attempts to key it out in these works were unsatisfactory and the collection remained unresolved although recorded by MT tentatively, but without much confidence, as cf. *C. lucorum*.

The following year we both visited the same site and made a second, much poorer collection, and with more literature now at our disposal, particularly Orton's two useful papers on the genus (Orton, 1955–58), we then identified it as *C. simulatus* P.D. Orton. However, our material did not dry well and none was suitable for molecular sequencing, so once again we were left with doubts, although his original description seemed to fit quite well.

Peter Orton described his species from Loch-an-Eilean (only a few miles from the Fairy Hill locality) and considered it as "probably not uncommon". The epithet *simulatus* means resembling or mimicking something and was probably coined by Orton because of its similarity to other members of section *Anomali*. Indeed, Orton relates in his original description how he first identified it as four other species over the years, before deciding that it was a new, independent species.

The fungarium at Kew has just four collections,

Fig. 2. A collection of *C. brunneotinctus* from the Italian Alps. Photograph © Marco Floriani.

including the holotype collection made by Derek Reid in 1955 and later described by Orton in 1958. Another collection is from Wales and two more from England. These three all need further examination and if possible, sequencing to establish if they are correct.

By this time, we were hard at work on our book on the British species of *Cortinarius* (Kibby & Tortelli, 2021) and while putting this book together we made contact with Marco Floriani, part of an Italian team who were also working on a *Cortinarius* book for Italy (Calledda *et al*., 2021). Marco very kindly shared with us details of their book and vice versa, and our email collaboration helped both teams resolve a few taxonomic and nomenclatural problems.

One of the interesting facts shared by the Italian team was that they had collections of a *Cortinarius* which they had traditionally called *C. simulatus* P.D. Orton but upon sequencing their collections discovered it matched a sequence derived from the holotype of *C. brunneotinctus* Niskanen *et al*. (Fig. 2). This species was described in 2012 from conifer forests in Canada and the photograph that Marco sent us looked very similar to our Scottish finds.

If we could obtain a further Fairy Hill collection and compare its ITS sequence with that of *C. brunneotinctus* we might be able to solve our mystery once and for all. Unfortunately, a search the next year was unsuccessful and our book had to go into print. A decision had to be made whether to call our collection *C. simulatus* or *C. brunneotinctus*. Because the photograph sent by Marco looked so similar to our specimens, we decided in the end to go with the latter, and this is the name used in our book.

It was not until 2024 that a further collection appeared on Fairy Hill (Fig. 3) and we were able to successfully obtain a good ITS sequence. We sent the sequence to *Cortinarius* expert Kare Liimatainen, who, when he worked at Kew, had sequenced many of the types of *Cortinarius*, including that of *C. simulatus* P.D. Orton. Back came the answer that the sequence was a very good match to that of the holotype of *C. simulatus* and bore little similarity to that of *C. brunneotinctus*!

So, here we have two species very similar in their gross morphology but with very different ITS sequences, and indeed they are not very closely related (K. Liimatainen, pers. comm.).

This is a lesson in not relying entirely on morphology in this difficult genus and perhaps in having the courage of one's convictions; too many species are very similar to each other. Anyone using our book should therefore change the name on p.95 from *C. brunneotinctus* to *C. simulatus*. Below is a description of *C. simulatus* which will hopefully encourage others to report any findings.

Cortinarius simulatus P.D. Orton

Cap 25–70 mm, broadly convex with margin remaining downcurved or even slightly inrolled, dark purplish brown when wet, felty-fibrillose, hygrophanous and drying to pale greyish brown or greyish violet.

Gills moderately crowded, deep violet to violet-brown when young then slowly rust-brown, adnexed-adnate.

Stem 40–100 × 10–20 mm, pale whitish violet, with whiter veil remnants visible, cortina prominent, white.

Flesh pale to deep violet.

Odour raphanoid, especially when cut.

Spores 7.0–8.5(–9) × 5.0–6.0 µm, ellipsoid, finely warted.

Habitat in mixed *Pinus* and *Betula*, mostly close to the *Betula* which is assumed to be the mycorrhizal host.

Notes: *C. brunneotinctus* has very slightly broader spores on average (7.0–8.5 × 5.5–6.5 µm), has more yellowish brown tones in its flesh with just a faint violet flush in the stem apex, and is described as lacking the raphanoid odour. It is perhaps confined to conifers rather than *Betula* and it is entirely possible that it also occurs in Scotland. Any collections looking like either species should be carefully checked and if possible sequenced.

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Fig. 3. The collection of *C. simulatus* made in 2024 from Fairy Hill, subsequently sequenced and compared with the sequence derived from Orton's holotype. Photograph © G. Kibby.

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Sporophagomyces chrysostomus (*Hypocreaceae*),

a 'spore-eating' fungus new to Britain

Brian Spooner[1]

Fig. 1. Mycelium covering spore mass on underside of bracket of *G. adspersum*, Puttenham, 20 November 2024. Photograph © H. Chilvers.

Two records of a remarkable fungus, *Sporophagomyces chrysostomus* (Berk. & Br.) K. Põldmaa & Samuels, not previously reported from Britain, have been made recently from Surrey. A general account of the fungus is given, along with a brief description based on the two British collections.

This species exhibits a quite specialised ecology, utilising the spores of wood-rotting bracket fungi which it effectively traps by developing a cottony 'net' comprising white, radially developed strands of hyphae. This is attached centrally to the host pore surface, with the rest of the feathery growth suspended just below the host hymenium, 'catching' the host spores as they are discharged. When so trapped, the spores, which are formed in vast numbers and released over an extended period, build up into a thick mass beneath the host brackets and may provide a good indication of the presence of the *Sporophagomyces* (Figs 1, 2 and back cover).

Sporophagomyces chrysostomus (Berk. & Br.) K. Põldmaa & Samuels, *Can J. Bot.* 77(12): 1765 (2000)

Hypomyces chrysostomus Berk & Broome, *Bot. J. Linn. Soc.* 14: 113 (1873)
Peckiella chrysostoma (Berk. & Broome) Sacc., *Sylloge Fungorum* 9: 944 (1891)
Hypolyssus chrysostomus (Berk. & Broome) Kuntze, *Revis. gen. pl.* (Leipzig) 3(3): 488 (1898)
Hypomyces porotheliiformis Lindtner, *Ann. Mycol.* 36: 326 (1938)

Anamorph:

Acremonium lindtneri (Kirschstein) Samuels & Rogerson, *Mycologia* 85(2): 248 (1993)
Septocylindrium lindtneri Kirschstein, *Z. Pilzk.* 20(4): 118 (1936)
Moeszia lindtneri (Kirschstein) G.R.W. Arnold, *Westfälische Pilzbriefe* 8(1): 13 (1970)

Mycelium white, cottony, comprising radially developed hyphae, hyaline, often in strands, septate, thin-walled, c. 2.5–4 µm wide, forming patches or eventually covering the entire underside of the host fruitbody. Conidiophores arising directly from mycelial hyphae, branched, c. 70 × 2–3 µm, gradually tapered to c. 1 µm at the apex; conidia hyaline, cylindric or cylindric-fusoid, 1–3-septate, slightly narrowed at septa, 11–13 (–16) × 3–4 µm, smooth. Perithecia developed on the mycelium, *Hypomyces*-like, gregarious, enveloped in whitish hyphal tomentum, KOH-negative, immature in present material.

Specimens examined: England, Surrey, Puttenham, Britty Wood, SU90194546, on underside of fruitbody of *Ganoderma adspersum*, 20 Nov 2024, H. Chilvers (K-M001444478); Godalming, Lammas Lands, by River Wey, SU97134411, same host, 30 Nov 2024, H. Chilvers (K-M001444393).

The host fungus of these two collections was reported initially as *G. applanatum* (H. Chilvers). However, basidiospores for both collections, measured subsequently, are in the range 9–11 × 5–7 µm, larger than those of *G. applanatum*, and characteristic of *G. adspersum*.

The characteristic anamorph of this species was described by Kirschstein (1936) in *Septocylindrium* (as *S. lindtneri*) based on material from *Ganoderma lucidum* from Serbia, and subsequently referred by Arnold (1970) to *Moeszia*. More recently it has been transferred by Rogerson & Samuels (1993) to *Acremonium*. The teleomorph is *Hypomyces*-like, with perithecia gregarious amongst a white hyphal subiculum, developed directly on the mycelium and not on the host hymenophore as usually seen in species of *Hypomyces*. In the Surrey material it is present only in an immature state. As described by Arnold (1970), Rogerson & Samuels (1993), and in Põldmaa *et al.* (2000), perithecia are papillate, pale, buff to yellowish, up to 245 µm diam., with a yellow ostiole. The asci are 8-spored, 80–100 × 5–6 µm, the ascospores 1-septate, hyaline, narrowly ellipsoid to fusoid, smooth or finely verruculose, sometimes with tiny apiculi, occasionally disarticulating into part-spores after discharge, 10–17 x 3–4 µm.

The nature of the mycelial 'web' has been variously interpreted. Based on its habit and appearance, it was considered by Lloyd (1915) to belong in *Sebacina* (basidiomycetes) and referred to *S. dendroidea* (Berk. & M.A. Curtis) Lloyd (= *Thelephora dendroidea* (Berk. & M.A. Curtis) Cooke). It has also been known as *Hyphelia bombycina* Fr. ex Weinm. (*Institale bombycinum* (Fr. ex Weinm.) Fr.) (Rogerson & Samuels 1993), which comprises sterile mycelium but occurs on rotten *Alnus incana*.

Although new to Britain, this is a surprisingly widespread species, found almost exclusively on species of *Ganoderma*. It was first described from Ceylon (Berkeley & Broome 1873), as 'parasitic on a feathery brown mycelium', though the brown colour was evidently due to the spores of the host, not otherwise noted. *Hypomyces porotheliiformis* Lindtner, shown by Arnold (1970) to be a synonym, and the anamorph, *Septocylindrium lindtneri* Kirschstein (Kirschstein 1936), were described from Serbia on *G. lucidum*. *S. chrysostomus* has since been recorded much more widely. As summarised by Rogerson & Samuels (1993), and by Leacock (online), its distribution includes Australia, N. America, Belarus, Brazil, Canada, Colombia, France, Germany, New Zealand, Poland, Puerto Rico, Serbia, Sri Lanka, Sweden, Thailand, Ukraine, and Venezuela. Lloyd (1915) also had material from Madagascar. Other than *G. adspersum* and *G. lucidum*, it has been reported in N. America on *G. applanatum* (Rogerson & Samuels, 1993). These authors also mention *Phellinopsis conchatus* (as *Fomes*) as a host.

Sporophagomyces chrysostomus is the type of the genus, introduced by K. Põldmaa & Samuels (in Põldmaa *et al.*, 2000) for three species with a similar ecology. The two other species, *S. lanceolatus* (Rogerson & Samuels) Põldmaa & Samuels, on *Rigidoporus microporus* from Puerto Rico, and *S. moellerianus* (Bres.) Põldmaa & Samuels, on *Pyrofomes* sp. from Brazil, differ from the present species in host, spore characters, and lack of an anamorph.

Fig. 2. Mycelium on spore mass on underside of *G. adspersum*, Godalming, 30 November 2024. Photograph © H. Chilvers.

Acknowledgements

Thanks are due to Hannah Chilvers and to Dick Alder (both West Weald Fungus Recording Group) for forwarding material of the two collections cited, and for the accompanying images.

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Collybiopsis subpruinosa in Britain

Graham Mattock[1]

Here in central urban Winchester, Hampshire, there is a small isolated stand of trees, mainly *Taxus baccata*, which have somehow survived despite the surrounding school, car park and housing developments. Whilst walking down the short footpath next to these trees in September 2024 the author noticed clusters of an agaric arising from the buried woody debris. Hygrophanous striate caps were reddish-brown when young soon becoming light-brown, gills were adnate and the stems cream-buff at the apex, dark brown to almost black towards the base. Viewed through a hand lens, the cap, stem and gill edges were found to be minutely pruinose. Initially I thought these were *Gymnopus foetidus*, which is locally common, but all the fruit bodies were odourless. Collected specimens dropped white, ellipsoid, inamyloid spores measuring 7.5–9 × 3.5–4 µm. The collection was tentatively named *Gymnopus inodorus*.

A subsequent trawl of the internet produced *Collybiopsis subpruinosa* which looked a good match for my collection. This species has a wide distribution being recorded from Argentina, Brazil, Costa Rica, Ecuador, Hawaii, Jamaica, Madeira, New Zealand, Panama, Puerto Rico and the USA where it is found on humus-rich soils, woody debris and logs. In Europe, where it has been recorded in Austria, Czechia, Denmark, France, Germany, Hungary, Italy, the Netherlands, Spain and Switzerland, *C. subpruinosa* is regarded as an introduced alien North American species. There are no records of *C. subpruinosa* on the FRDBI but it has made it onto update 11 of the British Checklist CBIB (Ainsworth & Henrici, 2023) via a 2021 collection from Nick Aplin found on buried debris beneath *Kalmia latifolia* (a New World ericaceous shrub) in a garden at Crawley, East Sussex. It was accepted by CBIB as *C. subpruinosa* “based on a comparison of its ITS sequence (N. Aplin) with those of this species sensu Antonín (MK646034) and Hughes & Petersen (e.g. DQ450027)” who are recognised specialists in this field.

Fig. 1. *Collybiopsis subpruinosa*, encountered in urban Winchester, September 2024. Photograph © Graham Mattock.

Eric Janke of the Hampshire Fungus Recording Group kindly agreed to DNA sequence my collection (accessioned on GenBank PV690299) and a BLAST search returned 100% matches, with over 95% query cover, to four *C. subpruinosa* sequences (PP578054, PQ509886, PP826430, MK646034) and another 100% match to a sequence from Mata *et al.*'s (2006) study of the genus, albeit with only 88% query cover (DQ450025). The MK646034 sequence is especially significant because this was one of the reference sequences used to confirm the identification of Nick Aplin's 2021 collection. My find appears to be the second known British collection for this species.

Dried material has been retained in the author's private herbarium H-25/9/24.

Collybiopsis subpruinosa was originally described as *Marasmius subpruinosus* by Murrill, it was transferred to the genus *Marasmiellus* by J. S. Oliveira in 2019 based on molecular data and then to the genus *Collybiopsis* by Petersen in Petersen & Hughes (2021) which details the complex taxonomy relating to *Collybiopsis*.

Acknowledgements

I thank Eric Janke for the DNA sequencing work on my collection.

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Feature focus: Going macro

Lachnella alboviolascens

Jens H. Petersen[1]

Many fungi are small, and the attempt to document this tiny world is a constant challenge to many mycologists. Fortunately the techniques for macro photography have developed enormously through the years.

When I started photographing fungi in the late 1970s, my ‘normal’ lens had its closest focus at about 60 centimetres. To get closer I had to move the lens away from the film by means of a set of extension rings. This was difficult, and one never got particularly close. A dedicated macro lens made the photography easier but still only brought the photographer in to around 0.5× magnification. Experiments with bellows or multiple extension tubes yielded results with higher magnification, but sharpness – and especially depth of field – was poor. In practice, images at around 2× magnification were the most one could realistically hope for.

Out came the digital cameras! Initially, photographers benefitted from the small sensor size and the correspondingly short focal length of the lenses, which provided significantly better depth of field. Later, the possibility emerged of taking multiple images at different focus planes, which could then be stitched together using software – allowing the final image to include all the sharp areas from the original photographs. Suddenly, depth of field was no longer a problem. If you had a sufficiently stable setup (including a fungus that didn’t dry out), virtually infinite depth of field became a possibility. Today there are plenty of medium level digital cameras that can shoot a series of macro pictures for stacking and even some that can do the stacking in-camera.

If you need to get really close, however, you will have to build your own setup. This can range from a camera with a special macro lens and a lamp, to complex rigs involving even more specialised lenses, bellows, flash units, and motorised macro rails. An easy shortcut to try photographing extreme macro is to use your microscope with a camera. Just put your specimen on a slide and under the lowest magnification (often x4). No liquid, no coverslip. Light it up with a cheap LED lamp on a swan neck and make a series of pictures with slightly different focus planes for stacking. The result is probably not super high quality photos, but a good start and useful pictures for identification.

The images in this page spread illustrate some of the development over the last 40 years. The first

Fig. 1. *Lachnella alboviolascens* photographed in 1988 with an old 55 mm Micro-Nikkor objective on Ektachrome film. Photograph © Jens H. Petersen.

Fig. 2. *Lachnella alboviolascens* from 2025 with a 45 MP camera, flash and a specialised macro lens. This image resolution is absolute overkill in any normal context but is used here with the hope of a future exhibition somewhere in the world featuring metre-broad, supersharp pictures of fungi. Photograph © Jens H. Petersen.

shot (Fig. 1) was made back in the 1980s with a macro lens on Ektachrome 35 mm film. It's grainy, completely blocked up in the dark areas, and not particularly sharp. The large image (Fig. 2), on the other hand, was taken with a small, dedicated specialist lens with a 45 MP camera and flash. It's a stack of 22 images, post-processed in ZereneStacker and Photoshop – the full resolution picture is so sharp you can go exploring down between the hairs!

Not everything, however, is about technique – nature and the fungi have to play along too. The third photo (Fig. 3), from 2013, was taken with a 12 MP camera and a macroscope with a zoom lens. It's a very efficient setup because the zoom lens allows you to bring the fungus into focus quickly, but zoom lenses always produce slightly poorer results than so-called prime lenses (lenses with a fixed focal length). This is one reason why the image is less sharp. However, it shows something rarely seen in these tiny fungi: how the spores are formed. On the fungus's hymenium, small glowing dots appear in groups of four. These are the spores sitting atop the basidia. This shows that the little cup is not an ascomycete, as one might otherwise have expected, but a basidiomycete — specifically *Lachnella alboviolascens*.

You can collect many, many of these tiny cyphellaceous fungi without ever seeing basidia with spores – this is a lucky shot that in many ways outshines later technical superiority.

Fig. 3. *Lachnella alboviolascens* from 2013. Here in a lower technical quality, but of a super-fresh fungus. The condition of the material is paramount if you want great pictures. Spritzing with tap water, using a small spray bottle such as those used for cleaning glasses, can help to keep the specimens fresh. Photograph © Jens H. Petersen.

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Fungal Futures: Conservation news and views

Matt Wainhouse[1] & Rich Wright[2]

Concerns for fungi in the Planning and Infrastructure Bill

We have a lot to learn in writing fungal news for a quarterly journal, but even more in political commentary. When the inaugural Fungal Futures column was written in January, the political rhetoric was only just beginning to position nature—particularly bats and Great Crested Newts—as impediments to growth and development (Wainhouse & Wright, 2025). By the time Field Mycology Volume 26(1) went to print in April, the narrative had sharpened.

In the intervening weeks, the UK Government published the Corry Review into environmental (de)regulation (Corry, 2025) and introduced a new Planning and Infrastructure Bill for England (2025). Now at the centre of widespread concern, Part III of this Bill proposes the creation of a Nature Restoration Levy: a mechanism that would allow developers to make financial contributions in lieu of conducting site-specific ecological assessments and delivering bespoke mitigation (i.e. actions to reduce harm) for species. The model is intended to fund broader conservation work elsewhere. However, this marks a fundamental policy shift where developers can 'buy out of' environmental regulation in a move away from the principle of "polluter pays" and towards "pay to pollute." With the benefit of hindsight, those early swipes at bats and newts seem less like isolated outbursts and more like a poorly orchestrated PR effort to soften the ground for this deregulatory agenda—casting nature as a barrier to economic growth rather than a public good in need of safeguarding.

While the Bill has serious implications for all biodiversity, it is particularly troubling for fungi given their historically marginal status in planning and conservation processes. Leading figures from the conservation, ecology and scientific community—including Prof. Sir John Lawton (author of Making Space for Nature), Sir Partha Dasgupta (author of The Economics of Biodiversity), Dr Tom Tew (former Chief Scientist, Natural England) (RSK Wilding, 2025), and the Office for Environmental Protection (2025)—have all expressed concern that the Bill weakens existing protections.

Although fungi have rarely been the focus of ecological impact assessments, progress has been made in recent years. Developers, when prompted, do now occasionally include fungi in survey work. These assessments have led to mitigation in select cases, particularly for rare or threatened species and assemblages. Under the new proposals, however, this site-specific consideration would no longer be required, raising the likelihood that fungi will be entirely overlooked.

Many of our rarest fungal species are highly localised, under-recorded, and ecologically specialised. Their survival often depends on ancient substrates and soils, old-growth habitats, or specific host species—conditions that cannot be recreated or offset through generic habitat creation schemes. The proposed system would remove the need for expert-led, detailed field surveys. This presents a clear risk: sites hosting rare or threatened fungi could be developed without their presence ever being recorded, let alone protected. It would significantly undermine progress toward national targets to reduce extinction risk and halt biodiversity loss.

As of early June 2025, the Bill has passed its second reading and committee stage in the Commons (Planning and Infrastructure Bill Committee Stage, 2025). Efforts to amend the legislation have so far been rebuffed. Notably, the government rejected proposals that would:

- Uphold the 'mitigation hierarchy', which is the longstanding principle that requires developers to avoid harm first and only cause and compensate for it as a as a last resort;
- Exclude irreplaceable habitats like ancient woodland from the levy scheme;
- Clarify when and how conservation measures should be implemented, and ensure they actually deliver for nature.

Ministers have argued these changes would reduce "flexibility" and point to protections already present elsewhere. That may be technically correct but the government's resistance to even modest, reasonable safeguards raises eyebrows. Especially worrying is the Bill's own impact assessment, which concedes there is "very limited data on how environmental obligations affect development," and also concludes that current regulations are sufficient to meet the need of the Bill (Planning and Infrastructure Bill. Annex 10 : Nature Restoration Fund, 2025). Concerned? Might be worth contacting your MP.

Global Fungal Red List passes the 1000 milestone

In March this year, global fungal Red Listing took a significant step forward with the publication of 482 new assessments (IUCN 2025), bringing the total to 1,318 species (including 134 lichenised fungi). This is more than double the number assessed in 2022, and marks a hard-earned milestone achieved over the past decade (IUCN 2025). Notably, 411 of these species are now recognised as vulnerable, endangered, or critically endangered, with a further 110 listed as near threatened. This vital work is supported by The Global Fungal Red List Initiative (2025) and a dedicated network of conservation mycologists from around the world.

The threats to fungi are shared across continents, and the main drivers are the same ones we're facing here in the UK. Of the species assessed globally, 279 are threatened by agricultural and urban expansion, 91 by fertiliser run-off and pollution, 198 by deforestation, and 50 more by climate-driven changes in forest fires (IUCN 2025).

As we're all too aware, fungi lag far behind other taxonomic groups when it comes to conservation attention and knowledge of diversity. And while this recent Red Listing work is excellent and often arduous, there's still a huge gap in the number of species assessed. For context: to date, 93,351 animals (including 64,411 vertebrates and 28,940 invertebrates) and 74,751 plants have been assessed, dwarfing the 1,318 fungi (IUCN 2025). Based on the number of currently described species, the underrepresentation becomes even clearer: 84% of vertebrates, 18% of plants, 2% of invertebrates, and just 0.8% of fungi. And that's based on the estimated 162,521 known fungal species—if we were to extrapolate even to more conservative diversity estimates of two million fungal species globally, the gap would be even more dramatic.

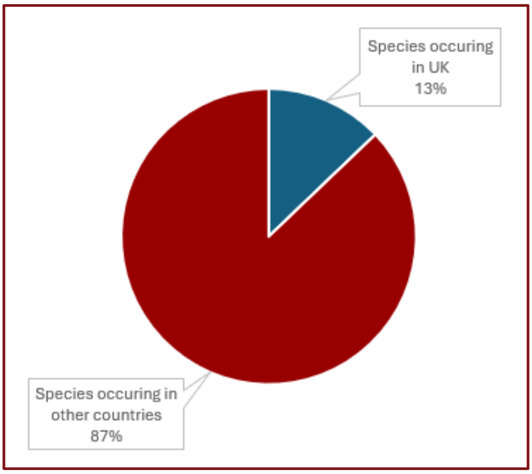

Fig. 1. Percentage of globally Red Listed species occurring in the UK. Seventy-seven of 521 globally species assessed as Near Threatened to Critically Endangered occur in the UK.

Seventy-seven of the globally threatened species occur in the UK, that means one in eight of the assessed globally threatened species occur here (Fig. 1). Perhaps most significantly, nearly half of these (37) are found in unimproved grasslands, reinforcing the global importance of this assemblage. Some of these grassland species are fungi we, as field mycologists, might consider fairly common in the UK, such as *Hygrocybe intermedia* (Fig. 2) or *H. quieta*. However, they are assessed as vulnerable due to the serious global decline of their habitat from anthropogenic pressures. Even here in the UK, where these species might be more frequently encountered, we

Fig. 2. *Hygrocybe intermedia* is globally assessed as Vulnerable. Photograph © Rich Wright.

have seen a historic loss of 97% of lowland meadows—and the fungi that rely on them—just in the period 1930–1984 (Fuller 1987), as a result of land-use change. Even now, unimproved grasslands continue to be lost to agriculture, development and tree planting schemes that often proceed without baseline fungal surveys. This highlights the UK's global responsibility for this habitat and its fungal communities, and the urgent need to further formalise their protection.

There are other globally threatened species that will be familiar to those involved in UK fungal conservation efforts, such as Oak Polypore (*Buglossoporus quercinus*) and some of the stipitate hydnoids (*Sarcodon*, *Hydnellum*, *Phellodon* spp.) that feature in Site of Special Scientific Interest (SSSI) assemblages (Bosanquet *et al*. 2018). Others appear on priority species lists for the devolved nations, including Orchard Tooth Crust (*Sarcodontia crocea*), Marsh Honey Fungus (*Desarmillaria ectypa*), and Fragile Amanita (*Amanita friabilis*). But there are also some globally threatened species not yet reflected in UK conservation lists or habitat assemblages, such as Wrinkled Peach (*Rhodotus palmatus*, Fig. 3) or Hoary Rooting Shank (*Paraxerula caussei*), among others.

These global Red List assessments add important weight to our understanding of species found in the UK, providing extra leverage when advocating for the protection of sites and species, and highlighting where priorities should be. This is especially valuable for fungi that currently lack a formal UK Red List status, and it also helps reinforce the case for those already recognised in UK conservation frameworks.

Fig. 3. *Rhodotus palmatus*, a familiar species in the UK, is Near Threatened globally. Photograph © Rich Wright.

Review of fungal assemblages in Welsh SSSIs highlights gaps in the protected sites network

An important but previously unreported development in fungal conservation deserves attention. In December, Natural Resources Wales (NRW) published a review of fungal representation within Sites of Special Scientific Interest (SSSIs) across Wales (Bosanquet, 2024).

The report, authored by Sam Bosanquet, NRW's Specialist Advisor for Bryophytes, Lichens & Fungi, is the first country-level evaluation of existing SSSIs to determine which sites would currently qualify for SSSI selection using the fungal assemblages and threshold values listed in the SSSI Guidelines (Bosanquet *et al*., 2018). A site reaching the required threshold for one or more assemblage (usually a certain number of species present) can be proposed for designation as a SSSI. Upon designation, which can be a lengthy process and is not guaranteed, the qualifying assemblage(s) are then listed among the "notified features" of the site and can be legally protected.

Drawing heavily on field mycological data from the fungal records database of Britain and Ireland (FRDBI) and using five fungal assemblage types, the Welsh review found that 64 existing Welsh SSSIs had at least one qualifying fungal feature present. However, fungi are only listed as a "notified feature" in NRW's databases for 12 of these sites, underscoring a persistent under-representation of fungal interest in statutory site designation. The majority of the qualifying fungal features are based on site assessments using the grassland fungal assemblage (47 sites). The other assemblages used in the review were of oak deadwood fungi (4 sites), stipitate hydnoids (3 sites), dune fungi (13 sites) and alder carr fungi (3 sites), the last of which were assessed using a provisional scoring system (Aron, 2019). The review went on to identify a further 129 sites with qualifying fungal features that currently fall outside any SSSI boundaries where they receive little or no protection. This finding points to a significant shortfall in coverage, with many valuable fungal sites vulnerable to degradation or loss.

The SSSI network was designed to represent and protect the best examples of Britain's natural heritage. Yet, as this report clearly shows, fungi remain severely underrepresented within that system. While assemblages within SSSIs designated for their non-fungal features may receive some protection from changes in land use, site management for those other features may inadvertently harm fungal communities unless their importance is recognised by land managers.

Perhaps even more concerning is the number of high-value grassland fungi sites that lie, unprotected, beyond the boundaries of the SSSI network altogether—a pattern echoed in the other UK nations.

The review also draws attention to sites where the presence of one or more threatened fungal species (assessed on global and/or national scales) would qualify as fungal features in their own right. Particularly notable is the report's frank appraisal of the current impasse in fungal red-listing within Great Britain, including the risks of relying on unratified Red Lists. The findings add to the growing consensus that a revised and authoritative approach to fungal red-listing is urgently needed to inform and support statutory conservation decisions.

This review marks an important step forward in identifying priority areas for fungal conservation within Wales—an approach that could be replicated elsewhere in the UK—and reinforces the need for consistent recognition of fungal biodiversity across UK conservation frameworks.

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The Biodiversity Heritage Library

A short appreciation article

Clare Blencowe[1]

The Biodiversity Heritage Library (BHL) is the world's largest open access digital library for biodiversity literature and archives. Working with a global consortium of contributors, BHL makes tens of millions of pages of biodiversity knowledge freely accessible, via this website:

https://www.biodiversitylibrary.org/

It will be well known to many readers of Field Mycology for providing unparalleled and easy access to multitudes of books, descriptions and illustrations which remain relevant today in interpreting taxonomic descriptions of fungi (Fig. 1). The BHL is also a rich resource for anyone interested in the history of mycology (Fig. 2) and aficionados of natural history illustration (Fig. 3).

For many years, BHL has been hosted by the Smithsonian Institution, but now finds itself at a crossroads, following an announcement that these hosting arrangements will end on 1 January 2026. The BHL Consortium has therefore issued a Call for Support from interested institutions and stakeholders, to establish new hosting arrangements and ensure continuity, resilience and growth for this essential global biodiversity infrastructure.

Since releasing their Call for Support, BHL reports that "the global response has been inspiring and heartwarming". Conversations are now underway exploring alternative technical hosting, funding and staffing models. You can read the latest updates on the BHL Blog:

https://blog.biodiversitylibrary.org/

The Call for Support remains open as this issue of Field Mycology goes to press and the BHL Consortium is asking users to help spread the word, through their own institutions and networks.

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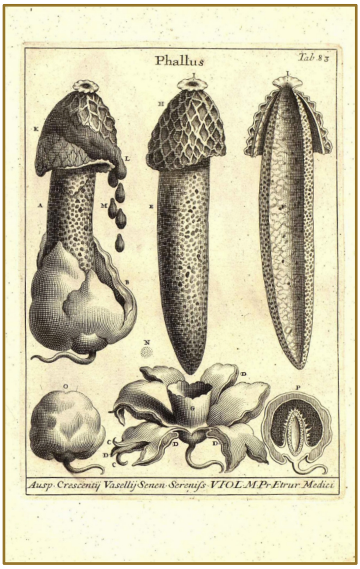

Fig. 1. An illustration from Nova plantarum genera by Pier Antonio Micheli (1729), later designated as the lectotype for *Phallus impudicus*. This volume is held by the library of Real Jardín Botánico, Madrid and catalogued by BHL at https://www.biodiversitylibrary.org/bibliography/73327. Not in copyright.

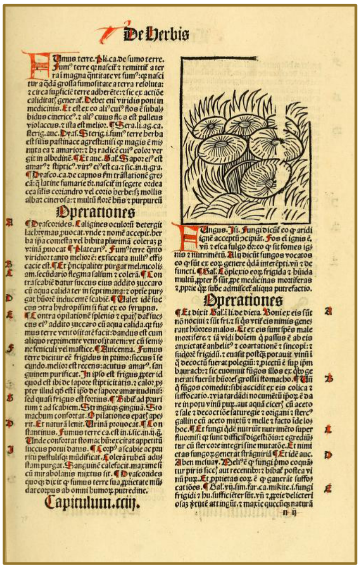

Fig. 2. A page from Ortus sanitatis by Johann Prüss (1497) showing the first printed illustration of a fungus. This volume is held by Smithsonian Libraries and Archives and available via BHL at https://www.biodiversitylibrary.org/page/40536006. Not in copyright.

Fig. 3. An illustration of *Amanita muscaria* from M.C. Cooke's Illustrations of British Fungi Vol. 1 (1881–1883). This volume is held by the University of Toronto - Gerstein Science Information Centre and available via BHL at https://www.biodiversitylibrary.org/page/23281011. Not in copyright.

Dr Nigel Stringer 1949–2024: an obituary

Fig. 1. Nigel Stringer. Photograph © Ian Morgan.

Nigel Stringer died suddenly just before Christmas, only eight days before his 75th birthday. He will be remembered as a leading member of the mycological community in Wales for his particular expertise in plant pathogens, especially rusts.

Nigel was born on 28 December 1949 and attended Llanelli Boys' Grammar School before moving to the University College of Wales, Aberystwyth. Here he gained a BSc followed by a PhD entitled "The biology of fungi on *Ulex europaeus* needles". One of his favourite stories related to an incident said to have occurred during his exploration of the Aberystwyth hinterland. He recounted that on one occasion his head-first inspection of the inner reaches of a gorse thicket attracted attention which subsequently led to his arrest and a trip to the cells in the local police station. Nigel told them to phone the department secretary, but she, knowing that Nigel was renowned as a practical joker, said she had never heard of him. In the end it fell to his department head to confirm his story and secure his release.

His first "scientific" employment was with the Welsh Water Authority scientific unit at Llanelli where one of his tasks included the sampling of rivers to determine pollution levels based on the presence of aquatic invertebrates and other indicators. Perhaps the most challenging and ultimately rewarding campaign was his contribution, aided by his friend R. H. ('Dic') Davies, towards the safeguarding of Carmel Woods on a limestone ridge in south-east Carmarthenshire from planned quarrying activities. After extensive legal challenges, and much work by the NCC/CCW team and NGO partners, the site later became a National Nature Reserve. By the early 1990s Nigel had joined the staff of the Countryside Council for Wales (CCW), initially in mid-Wales then later with the Carmarthenshire team where much of his work involved Sites of Special Scientific Interest (SSSIs).

Throughout this time, Nigel maintained his natural history interests and assisted Dr. Philip Jones, the Carmarthenshire Fungus Recorder, with fungus recording activities throughout Carmarthenshire. Nigel regularly supported autumn `fungus forays` held by the Llanelli Naturalists' Society and, in recent years played an active role in support of events run by the neighbouring Pembrokeshire Fungus Recording Network (PFRN). A favourite observation of his was that on any fungus foray he would rarely have to venture beyond the car-park: without fail he would compile an extensive list of rusts, usually including notable or first records for the county.

Nigel, as one of the Welsh Microfungi Group*, will be remembered for his contribution to a series of checklists, identification guides and red data lists compiled, published and updated by the Group since 2015 (see: https://www.aber.ac.uk/waxcap/links/index.shtml). In recognition of their efforts the Group received the BMS 'Field Mycology Award' in 2019.

In the course of his studies Nigel established extensive links with other specialists in the field including leading experts in Europe and North America. In recent years, his studies were enhanced through access to DNA-barcoding of specimens which in turn supported a number of projects focussing on rusts and mildews with the output appearing in various publications including this one together with regular contributions to PFRN newsletters.

A great raconteur and communicator, Nigel always entertained those who surrounded him as he educated them on the finer points of rust biology. He was always anxious to encourage non-mycologists who brought him rusts by saying something like "Yes, So-and-So, actually quite a common rust but one of my favourites, Well done! Do collect more." ….and one was hooked. Many people valued Nigel's genuine friendship and marked kindness as well as respecting his scientific knowledge and contribution. He is most sadly missed.

David Harries, Ian Morgan, Arthur Chater,
Debbie Evans, Paul Smith & Ray Woods

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[*] Nigel Stringer, Ray Woods, Arthur Chater, Debbie Evans & Paul Smith.

Book reviews

European Boletes: Volume 1

Michal Mikšík, Matteo Gelardi & Giampaolo Simonini

Fungi Press, June 2025
ISBN: 9788011057022
Hardback 704 pp.
£98 from https://www.fungipress.eu/en/ and specialist booksellers

This mammoth work must surely rank as the most comprehensive review of its subject to date. It runs to over 3 ½ kg, 704 pages, more than 1500 photos and 2000 bibliographic references. The introduction alone, including dichotomous keys to genera and species, occupies a hundred pages. This is an epic work in every sense. Even more so when we remember that this is only volume one, with a second somewhat smaller volume promised. Here, 62 species and 36 forms or varieties in 17 genera are dealt with. These are all the larger red- and yellow-pored genera: *Butyriboletus*, *Boletus* s. str., *Caloboletus*, *Cupreoboletus*, *Cyanoboletus*, *Imperator*, *Neoboletus*, *Rubroboletus* and *Suillellus*, also *Lanmaoa*, *Leccinum*, *Leccinellum*, *Porphyrellus*, *Strobilomyces*, *Tylopilus* and two further genera unknown in Britain.

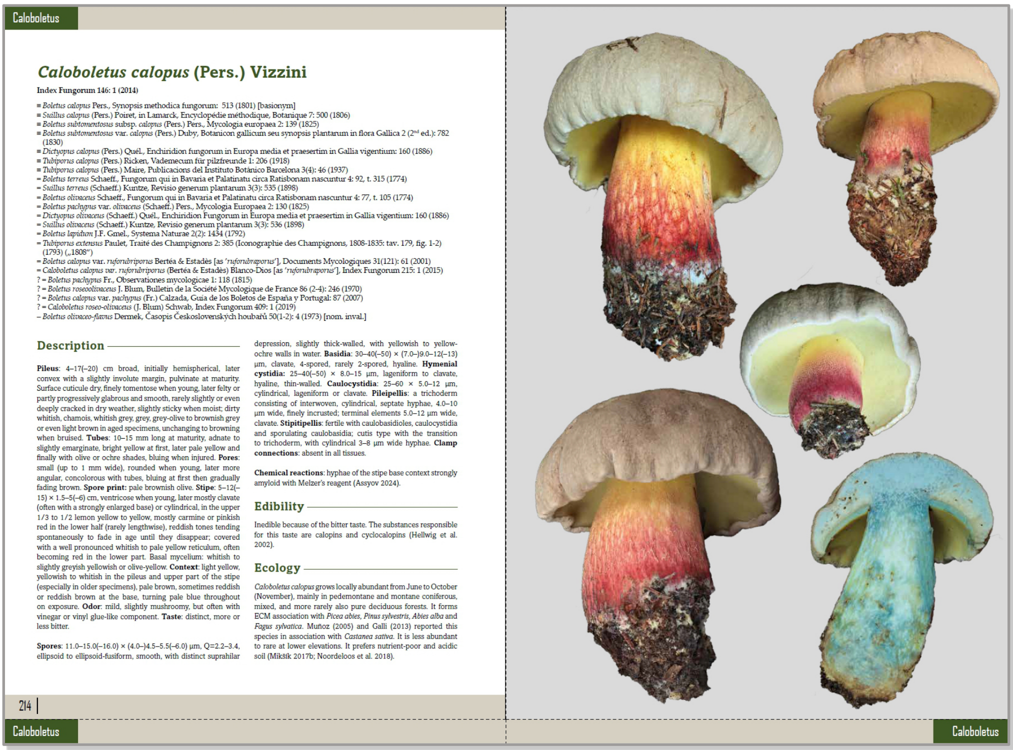
To give an idea of the coverage of this sumptuous work look no further than the entry for *Boletus edulis*, which spreads lavishly over no less than 20 pages! It includes comprehensive text, well laid out under separate headings. Each entry starts with an extensive description of both macro and micro details, then edibility, ecology, distribution (including map), affinities (similar species), occasionally additional information on variability, and finally notes. We are also treated to literally dozens of excellent high-quality photographs depicting the fungus in all stages of development in different kinds of habitats, in all kinds of colour forms and varieties, plus photos of microscopic features such as spores. This is a 'no stone left unturned' approach. Take for example the entry for *Neoboletus praestigiator* f. *pseudosulphureus*, basically just a yellow-capped form of what was once *Boletus erythropus*. In most books it would barely get a mention, if any at all. Yet here, even for this obscure colour form, we are treated to an amazing range of 64 fruitbodies in 16 photos spread over eight pages. There is never going to be a better way to understand the variability and look of a species than by flicking through the pages of this book. Most collectors could walk around for an entire mycological lifetime and never manage to see such a diversity of species in such an array of different guises.

For each entry there is an extensive list of synonyms, sometime half a page's worth – nomenclatural research appears to have been thorough. As with all new publications, we are exposed to the latest opinions on the correct names to use. The relatively unfamiliar name *Neoboletus praestigiator* is used here (as in Geoffrey Kibby's Mushrooms and Toadstools of Britain and Europe, Volume 1, published in 2017), for what older readers will have known as *Boletus erythropus* and then later as *B. luridiformis*. It is also suggested that we revert to *Leccinum rufum* just when we were getting used to using *L. albostipitatum*, and to *L. aurantiacum* instead of *L. quercinum*. *Boletus aestivalis* is preferred over *B. reticulatus*. No wonder the ecologist Ted Green refers to mycologists as "the name changers".

In a short review, it is impossible to fully convey the vast scope and coverage of this impressive book. It is traditional to try and have a balance of pros and cons, but scrambling around for any cons to this book becomes rather a churlish exercise. With the provisos that you will need to have both the strength to lift a nearly 4 kg book and £98 in ready cash, if you are truly interested in *Boletus*, this is a must have.

In the preface, the authors suggest this book may become an indispensable tool for the study of European boletes, but such is the breadth and depth of this monumental work it is likely to become the *only* tool that will be needed, for years to come. They boldly claim that they aim to provide the most complete and updated overview of European boletes, summarising all current knowledge, and after a considered viewing of this book, it would be hard to imagine anybody who could possibly disagree with them.

Mario Tortelli



Caloboletus calopus (Pers.) Vizzini

Index Fungorum 146: 1 (2014)

≡ *Boletus calopus* Pers., Synopsis methodica fungorum: 513 (1801) [basionym]
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= *Boletus calopus* var. *ruforubriporus* Bertéa & Estadès [as '*ruforubraporus*'], Documents Mycologiques 31(121): 61 (2001)
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? = *Boletus pachypus* Fr., Observationes mycologicae 1: 118 (1815)
? = *Boletus roseoolivaceus* J. Blum, Bulletin de la Société Mycologique de France 86 (2-4): 246 (1970)
? = *Boletus calopus* var. *pachypus* (Fr.) Calzada, Guía de los Boletos de España y Portugal: 87 (2007)
? = *Caloboletus roseo-olivaceus* (J. Blum) Schwab, Index Fungorum 409: 1 (2019)
– *Boletus olivaceo-flavus* Dermek, Časopis Československých houbařů 50(1-2): 4 (1973) [nom. inval.]

Description

Pileus: 4–17(–20) cm broad, initially hemispherical, later convex with a slightly involute margin, pulvinate at maturity. Surface cuticule dry, finely tomentose when young, later felty or partly progressively glabrous and smooth, rarely slightly or even deeply cracked in dry weather, slightly sticky when moist; dirty whitish, chamois, whitish grey, grey, grey-olive to brownish grey or even light brown in aged specimens, unchanging to browning when bruised. **Tubes**: 10–15 mm long at maturity, adnate to slightly emarginate, bright yellow at first, later pale yellow and finally with olive or ochre shades, bluing when injured. **Pores**: small (up to 1 mm wide), rounded when young, later more angular, concolorous with tubes, bluing at first then gradually fading brown. **Spore print:** pale brownish olive. **Stipe**: 5–12(–15) × 1.5–5(–6) cm, ventricose when young, later mostly clavate (often with a strongly enlarged base) or cylindrical, in the upper 1/3 to 1/2 lemon yellow to yellow, mostly carmine or pinkish red in the lower half (rarely lengthwise), reddish tones tending spontaneously to fade in age until they disappear; covered with a well pronounced whitish to pale yellow reticulum, often becoming red in the lower part. Basal mycelium: whitish to slightly greyish yellowish or olive-yellow. **Context**: light yellow, yellowish to whitish in the pileus and upper part of the stipe (especially in older specimens), pale brown, sometimes reddish or reddish brown at the base, turning pale blue throughout on exposure. **Odor**: mild, slightly mushroomy, but often with vinegar or vinyl glue-like component. **Taste**: distinct, more or less bitter.

Spores: 11.0–15.0(–16.0) × (4.0–)4.5–5.5(–6.0) µm, Q=2.2–3.4, ellipsoid to ellipsoid-fusiform, smooth, with distinct suprahilar depression, slightly thick-walled, with yellowish to yellow-ochre walls in water. **Basidia**: 30–40(–50) × (7.0–)9.0–12(–13) µm, clavate, 4-spored, rarely 2-spored, hyaline. **Hymenial cystidia:** 25–40(–50) × 8.0–15 µm, lageniform to clavate, hyaline, thin-walled. **Caulocystidia**: 25–60 × 5.0–12 µm, cylindrical, lageniform or clavate. **Pileipellis**: a trichoderm consisting of interwoven, cylindrical, septate hyphae, 4.0–10 µm wide, finely incrusted; terminal elements 5.0–12 µm wide, clavate. **Stipitipellis**: fertile with caulobasidioles, caulocystidia and sporulating caulobasidia; cutis type with the transition to trichoderm, with cylindrical 3–8 µm wide hyphae. **Clamp connections**: absent in all tissues.

Chemical reactions: hyphae of the stipe base context strongly amyloid with Melzer's reagent (Assyov 2024).

Edibility

Inedible because of the bitter taste. The substances responsible for this taste are calopins and cyclocalopins (Hellwig et al. 2002).

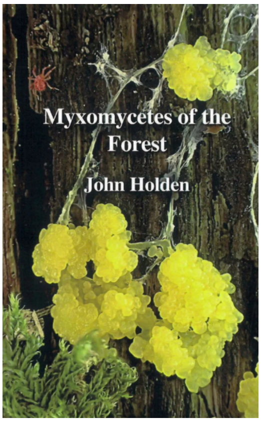
Ecology

Caloboletus calopus grows locally abundant from June to October (November), mainly in pedemontane and montane coniferous, mixed, and more rarely also pure deciduous forests. It forms ECM association with *Picea abies, Pinus sylvestris, Abies alba* and *Fagus sylvatica*. Muñoz (2005) and Galli (2013) reported this species in association with *Castanea sativa*. It is less abundant to rare at lower elevations. It prefers nutrient-poor and acidic soil (Mikšík 2017b; Noordeloos et al. 2018).

Myxomycetes of the Forest

John Holden

Privately published, January 2025
ISBN: 9781036907280
Hardback 162 pp.
£29.99 from specialist book sellers



This informal and charming little book details the author's finds of slime moulds over many years, mainly from the Forest of Dean, Gloucestershire. The 98 species treated are illustrated with numerous excellent photos, both in the field and under the microscope, including the seldom illustrated immature states, so often met with in the field.

Descriptions are in the form of notes, with discussion on difficult or unusual features. A user-friendly Introduction covers 'What are Slime Moulds?', Ecology of Slime Moulds, Collection and Identification, and Classification. The Index of Species usefully includes synonyms and current names according to https://nomen.eumycetozoa.com.

Note that this is far from a conventional guide to British Myxomycetes. It only covers species the author has personally studied. It is essentially a worked up version of his admirably detailed collection notes. Self-published (help from Geoffrey Kibby is acknowledged), this book enables these notes to reach the wider readership they surely deserve.

This is not a stand-alone identification book: the book contains no keys to species. However, priced at £29.95 it provides a very useful addition to the library of anyone interested in slime moulds and their identification.

Dinah Griffin

Field Mycology

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British
Mycological
Society

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